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SPECIALLY DESIGNED AS A

Medium of Correspondence

AMONG THE

HEADS OF TRAINING COLLEGES, PAROCHIAL CLERGYMEN, AND ALL
PROMOTERS OF SOUND EDUCATION, PARENTS, SPONSORS,
SCHOOLMASTERS, PUPIL TEACHERS, SUNDAY-
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LETTERS OF A GERMAN ON ENGLISH EDUCATION.

Translated from the German of Dr. Weiss, Professor of Joachimsthal College at Berlin, by Dr. A. Selfs.

(*Continued from p.* 465.)

TENTH LETTER.

Steady adherence to Traditional Customs, united with Sense of Necessary Reforms.—The English Universities, Oxford and Cambridge.—In what their Laws and Nature differ from German Universities.—The Colleges.—The Tutorial System.—Standard of Morals among the Students.—Expense of College Life.—Fellows.—Lectures of Professors.—Manner and Mode of Studying.—No Professional Education.

WHEREAS in Germany uneasiness and fluctuation are at present prevailing to such a degree, as to draw every rule and every institution towards the current of reform, the English have dropped but few of their established customs, and have steadily adhered to the ruling principles of public and private life in their country. They appear sometimes rather too much addicted to outward forms and ceremonies, which have induced some foreigners to call their whole devotion a merely mechanical habit, at the bottom of which there was no idea of religious feeling. This reproach is not wholly without foundation; but I ask whereto have *we* been led by the opposite tendency to do away with all forms, and to make our own free minds the temple in which we adore Heaven? It has extinguished the blessings of religion in our families, and annihilated the general influence of our church, which now can hardly be re-established. If the outward forms are abolished, the mind embodied in them will be going too, whereas the commandments will keep him safe who keeps them.

A conscientious respect for established forms characterizes the English, and yet personal freedom of action is not impaired by them within its proper limits. The same conservative character appears in the history of their poetry. They have once overturned the classical rules of style, and their Shakspeare has delivered also Germany from the *soi-disant* classicism of the French; but whilst in Germany, a licentious romantic school has refused every liability to the standard poetry of antiquity, we see the English poets imitating still the ancients, and accommodating themselves to the perfect models delivered in the classics. It is obvious how much the same conservative character, combined with a sound sense of useful reform, has done to form and support their political institutions which, by means of the loyal and disinterested spirit of their citizens, have attained a prosperity and degree of freedom, unrivalled by any ancient or modern commonwealth.

Schools do but share the conditions and transformations of public or private life at large. They are in England not bound by any common rule at all, and form in this respect the most decided contrast to those of the continent. They have for centuries been the same as they are now yet they are not so stagnant as to exclude every amelioration and wise improvement; only the impatient reformers will be dissatisfied with them. The observation of laws existing is their first rule, and never is anything abolished in a sudden or abrupt way, for fear, lest by a natural necessity, the old abuse might return with a reaction ensuing on the miscarriage of the reform. This is the reason why in England one thing seems always to have grown by another, and why nowhere marks of design and preconceived schemes occur to the observer. Whenever an alteration has appeared necessary, a party joins to carry it out; there will always be some opposition, but when they are able to bring forth a movement in behalf of the reform, and to gain champions for it in parliament, the measures desired never fail to be accomplished.

Such movements are at present going on in England, concerning both the highest degree of scholastic education or the universities, and its lowest degree or the national schools.

It is not my design to dwell on English universities at the same length as on the schools that prepare for them. But I have thought it a fit sequel to the statements already given, to represent also the principles upon which universities rest in England, according to the impression that Oxford and Cambridge left on my mind.

No greater contrast can be imagined than that of the turbulent bustle of London life, and the profound tranquillity reigning only at a small distance off at Oxford. In the metropolis the present age has chosen its seat, and is turning it around with vibrating agitation; at Oxford some remains of the middle age have a refuge, and impress with an old and venerable appearance the whole town, the population as well as the buildings. My heart is swelling, whenever I remember this sojourn, for I have never met with a place which combined so much solemnity with such charming environs. When I was a few years ago in the vicinity of Palermo, and visited the Benedictine cloister, Monreale, where the prior showed me his dwelling-place and his study, I was enraptured with the splendid view which this spot commanded, and have thought it, often since, the most delightful and most desirable place in the world wherein to muse at leisure in retirement and study. But even the image of Monreale must fade, when I remember the impression of the Protestant Benedictine cloisters in England; when I recall to mind Christ Church at Oxford, Trinity College at Cambridge, the gardens behind the latter college along the river Cam, or Merton College, All Souls, New College, Magdalen College, or Exeter College at Oxford.

The less doubt there can exist respecting the beauty and splendid outward appearance of these seats of the Muses, the more disputed are their intrinsic value and what they accomplish. Even in parliament I have heard people saying they were obsolete institutions, and no longer able to fulfil the purpose for which they were intended; and that every prejudice had taken its refuge in them. Powerful replies and splendid encomiums were not found wanting. Perhaps the correctest and most impartial opinion of them has been expressed by Arnold, who writes to a friend in the following terms: "The English universities are the best places in the world for a young man who avails himself of them for his education, but they are the most pernicious for him who indulges himself; to such a person it would be indeed more advisable to go to Van Diemen's Land, and to gain his bread by his hands."

It is generally known that the principal difference of German and English universities consists in the point, that the students of Oxford and Cambridge live constantly together in their colleges and hear few lectures, whereas in Germany the students reside each by himself, and come only for a few daily hours to the university, where they attend to those public lectures which they choose to hear. An English university is composed of several boarding establishments for young men, the larger and better of which are called *colleges*, the smaller *halls*. Oxford has nineteen colleges and five halls, Cambridge fourteen colleges and three halls. The members of all the colleges and halls assemble only in the great examinations, and in some lectures of certain professors; they are represented by one senate and chancellor; the Duke of Wellington held this office for Oxford at his death, Prince Albert for Cambridge. The few halls, *aulæ* or inns, are remains of the original institutions which were more free than the colleges of the present day; they are only superintended by fellows who do not reside in them. At first all the students lived in such halls, with a master authorized to provide for them with bodily as well as spiritual food. There were 300 such halls at Oxford in the time of King Edward I., when the number of students is reported to have amounted to 30,000 in all; which statement is an apparent exaggeration, By and by stricter rules became predominant, for the halls were replaced by colleges, on which bishops and princes had settled extensive funds and corporation privileges. This caused the number of students to be considerably diminished. At present Cambridge has 1750 members, and Oxford a number still higher than that.

The student who is received in a college enters by this act into a corporation of political and ecclesiastical importance; the universities have a few times quite taken the fore-ground in the history of England. Both are entitled to return each two members into parliament. As to the church, they maintain themselves in connection with it by requiring an oath of allegiance to its doctrines, and a subscription to the Thirty-Nine Articles by every member entering.

Persons admitted have in their college three rooms, a study, a sleeping-room, and another to put their things in. The tutor who is appointed for each student, must take care that he observes the rules of the college. As there is not sufficient room in the colleges for the total number of students, undergraduates may, during the first year or longer, live in private houses. They dine with the others in the hall of the college to which they belong, and are obliged to be at least once every day present at divine service in the chapel of the college, either at seven o'clock in the morning, or at six in the afternoon, and strict control is exercised in this point. The landlord with whom they lodge must write down the exact time when they come home at night, and deliver this account to the principal of the college at the end of every month. Neglect of this or other rules is punished by loss of the privilege. Ten o'clock is the time when a student must be at home.

A great many technical expressions designate the terms spent by a student at the university, or the prizes he has gained, or his rank. The latter is of influence in the expense of matriculation, which at Cambridge amounts to 10*l.* for the son of a nobleman, besides some extra fees, and only to six shillings for a *sizar* or poor student whose position is not quite so miserable at present as Goldsmith and some English plays have represented it. The difference of rank is also observed in the dining-hall; the noblemen and fellow-commoners dine with the fellows commonly at four o'clock; and then the others take their meal, the sizars on side-tables. Some differences appear even in the dresses of students at public solemnities, though for every day a student wears always the usual cap and black gown whenever he goes out.

The reception into each college happens at Michaelmas. A particular right for entering certain colleges, is by their statutes attached to certain families, or counties, or public schools. Such a connection exists between Eton and King's College at Cambridge, Winchester, and New College at Oxford. At some schools there are departing examinations for college, the committee being appointed and sent thither by the university. Some colleges require a preliminary examination on entering. The conditions for passing are not equal in different places. Though at Oxford a trial precedes generally, yet the students entitled by the statutes to reception, are never rejected, and it has become usual not only to choose questions universally known, but also to find the answers given satisfactory in any case. Many persons have expressed to me their desire that stricter rules for examination were laid down at the universities, or that departing trials were established in all the schools preparing for college, like those of the Prussian gymnasia. Then the universities would no longer be obliged to teach elementary knowledge. Sometimes in England a recommendation is thought sufficient for reception. The age of the students is very different; there are some who have decided rather late to go to college, and there are youths who have hardly passed the period of boyhood. Edward Gibbon went to Oxford, being fourteen years of age, Arnold in his sixteenth year.

Like the public schools, also, the English universities have more regard to the moral and national education of the students, than to their intellectual cultivation. Those who impute to them considerable defects, yet admit that both the universities are excellent establishments, because they *turn out gentlemen;* it will be seen how this is effected. The students live close together in their colleges, and here the youths stand in an immediate and daily intercourse with older and more cultivated persons; they form, besides, acquaintances with their equals, and whether they foster contention or friendship towards them, they will always be compelled to activity and decision in words as well as in deeds, and will generally enjoy all the advantages of a well-adapted society. Our professors are so much separated from the students, that they hardly know a single one of them by name; therefore they exercise no other influence on them than that of their lectures, which must be the more limited, as the students may stay away and discontinue to attend their lectures when they choose. The English plan is for the greater number of students undoubtedly the better. It is quite true that a German student will look upon English colleges as mere continuations of the school, and would for himself not submit to a system which put him constantly under control, and left no occasion for his favourite pursuits. On the other hand, the English are surprised at the boundless liberty of our universities, which they believe prejudicial to education, as proper rule and restraint are wanting. They consider their own students quite as pupils, and this is the reason why they give them a tutor. Preceptors of this kind are thought by them so indispensable for education, that they have taken our *privat docenten* (*i. e.* lecturers, having settled at a university on their own hand, and not yet appointed to a professorship), for *private tutors*, as if they were charged with the immediate inspection and education of the students. It is certainly a singular experience that, when the short period of liberty enjoyed at a university has elapsed, our students turn out greater "Philistines" than those of England, who bring from their colleges, in spite of the restraint under which they are put, a gayer disposition and bolder spirits than ours.

The old statutes contain: "Est ea quidem ineuntis ætatis imbecillitas, ut provectiorum consilio et prudentiâ necessario moderanda sit; propterea statuimus et volumus ut nemo ex baccalaureis, discipulis, pensionariis, sisatoribus, subsisatoribus, tutore careat; qui autem caruerit, nisi intra quindecim dies unum sibi paraverit e collegio ejiciatur. Accordingly, the principal of every college assigns to each of his students his particular tutor on entering. As the tutors must remain unmarried, they often leave the university at the moment when they begin to be accomplished and experienced enough in their task. Many of them are too young to be able to maintain a strict discipline. Morals are said to be somewhat loose, at present, at both universities. Tractarianism had of late effected at Oxford a powerful and nearly monastic movement, and established severer manners; but these ascetic habits were but transient. Every young man must on entering lay down a caution of 10*l.* that he will behave properly. There are not wanting tutors and principals who will occasionally connive at the extravagancies of students, nor can the proctors follow them in their various ways of spending their money; and thus a kind of compromise happens to take place which lets the student believe he is trespassing by public authority. In general, the English student is less rude than the German was until lately, and is perhaps still; witness the habitual beer-drinking, and the revels committed in the open market-place of Jena. In England the student chooses his amusements by no means exclusively among collegians, nor lives he so constantly at the *cabaret*, but he diverts himself rather by the pleasures and sports adopted in high life. Debts are, I hear, contracted to a considerable amount, while engaged in these pursuits.

College life is, in England, enormously expensive, as an average account will show. At Oxford a student wants £300 per annum, at Cambridge £250, at Dublin £200, at Durham £150, at Edinburgh nearly £100, at Glasgow £70, at Aberdeen and St. Andrews £50. This renders collegiate instruction inaccessible to any but wealthy people, at least as regards England. Yet it would be short-sighted to consider this order of things as throughout bad; in countries where higher instruction has become so very cheap, the church has been filled with a great many ill-bred and mean-spirited persons who are very little to her honour. Gift and inward determination will rarely miss finding the means to overcome pecuniary difficulties; a good light burns through the measure under which it is put. And in England assistance is as ready as anywhere to be obtained in aid of the efforts of genuine merit. The greater number of the fellows, the ablest of all the students in general, have sprung from poor families.

The fellows are graduates, out of whom the principal of each college chooses the tutors. They dwell there and have a salary of £100 to £400 per annum, with board, until they marry or accept another appointment. In a few instances fellows have been allowed to marry at the university, in order to prevent their leaving. Oxford counts above 200 resident fellows, Cambridge a smaller number. Some colleges have got more fellows than they employ as tutors, and thus many of them are not at all engaged there in any duties. Oxford has only seventy-eight tutors this year, and their salary is by increased activity susceptible of considerable augmentation. As to the other fellows, they have particular obligations; they are supposed to employ their leisure in study, and so they do generally, though not all of them. Some assist clergymen of the vicinity in their duties. A fellowship is considered as a great honour, or else it would not so often be mentioned with the names of former university members, even when they have left college long ago. The fellows are charged with the examinations, which are common to all the colleges; it is the senate which choose those that are to examine.

There may be about twenty-four professors at each university to teach the different sciences. Their position is the same as that of our professors, but that they deliver fewer lectures, which are frequented by few students, and only by such as have passed the first three years. Dr. Arnold had unexampled success when he entered his professorship for history, shortly before his decease.

From what I have said, it appears that in college tuition the same method usual in schools is predominant. When a student has taken his degree, he is no longer under the control of his tutor. He may become Bachelor of Arts three years and three months after his entrance, and every body is expected to take this degree. Nine years later he can become Master of Arts, and consequently only few aim at this degree. For both an examination must be passed, which is anything but easy. Not so difficult are the examinations for honours (or for prizes) which form the chief stimulus to industry. In Cambridge more than 11,000 thalers are spent annually in prizes, according to the statutes of that university. As thus the chief activity of students is directed to the acquisition of those prizes, people justly complain that Oxford and Cambridge have become *prize-awarding* bodies, instead of *educating* bodies. Their system might be compared to that of a general who forms soldiers, not for the battle-field, but for the parade. It commits the mistake, not unusual among men, to confound the purpose with the means that lead to it. Somebody may get the Chancellor's medal at an English university, and be nevertheless a very ignorant person.

The undergraduates of each college are divided into classes of ten, twelve, twenty, to forty students, according to their advancement, and to the object that is taught. Two or three principal tutors preside over the instruction; they may choose assistants among the other tutors. All these belong to the order of public tutors. The tutor teaches those assigned to his care all the knowledge requisite for the examination, tells them what they must read, and confers with them respecting the books that each would most like to read. At Oxford the books for reading are fixed, and every object has its text book; ethics refer to "Aristotle's Eth. ad Nicom.," "Logic to Trendelenburg's Elementa," or other standard books on the subject. These text books are translated into English exactly as at schools, interpreted, repeated, and asked over again until they are sufficiently known. At Cambridge readings are not fixed, and the classics are not so exclusively the object of instruction, but mathematics are required there from every body up to a certain point.

This training method of the English universities, setting exercises, examining on sections fixed, requiring metrical compositions of a certain length, nay, giving impositions and holiday tasks, as is done at King's College, is entirely opposite to our notions of a university, and the course taken among us. The English, being aware of this difference, have in their turn not omitted to sneer now and then at our universities. S. T. Coleridge humorously calls them bazaars, where each professor had his shop, and addresses the passers by: "Here good Greek, here excellent history!" Each is eager to catch as many students as possible for himself, and to say things that were never said before; for, if it were known by others, or if what he said had been printed, why should the students write down so scrupulously whatever they hear? As if we were still in the middle age, and the art of Guttenberg had never been discovered. They have often thus been amazed at the constant use our students make of the pen, and they find in it a good deal of superstition towards the decrees of the professors. Their own students are always reading for honours, reading for degrees, and resort not thus to the pen as their chief auxiliary for learning.

Those that entertain such opinions in England, value too little the incredible influence which oral delivery, and lectures by a professor who has himself inquired into a subject, must have on beginners; youth is particularly susceptible of this influence. We look, besides, more at the disposition which a student may have for some objects in particular, and therefore allow every one to choose his teacher as well as the lectures which he will attend, whereas the English teach all their students the same things, and look principally on that part of knowledge which they must possess in every case. Our scientific endeavours tend to liberty, and easily lose themselves in vagueness, theirs are quite determined and especial, and tend to form character. They say a German student would in very short time become the critic and judge of his own teacher, for the destructive character of our science obliged him to form his own opinion. This is what the English have denominated Germanism, a tendency of which they are so afraid, that they have become opposed to any approximation to our university institutions.

Though our students may in general attend any lectures they like, yet they belong only to one faculty, and pursue early a professional course of instruction. The English universities not being divided into several faculties have no regard to profession, and bestow a liberal education of a general nature on their members. Keeping the usual number of university terms, passing the examinations, and taking a degree, do not at all entitle to any appointment. The English have no such places or employments at which they aim during their time at college, and though their country is the best governed of all, there are yet the fewest officers employed by Government. Divinity is, perhaps, most kept in view in their college-instruction, but clergymen learn the duties of their profession practically, either by acting as curates, or in Theological Colleges; after this they present themselves to the bishop, who orders a chaplain to examine them, and gives them holy orders and an appointment. Therefore divinity is in England not considered as a science, according to Whately, but consists principally in the functions connected with the duties of a clergyman. Nor are students of medicine trained for their profession at the university, but in hospitals. No more are lawyers, though Lord Brougham said in 1850, in the House of Lords, the best judges in England had been wranglers at Cambridge. In short, it appears that English universities give no professional education like ours, but teach all the students exactly the same things, previous to their decision in favour of a certain profession.

ORTHOGRAPHICAL REFORMS.

(Continued from p. 375.)

Dr. Webster's treatment of the class of words last under consideration (those with the prefix *en* or *in*) is hardly characterized by his usual accuracy and consistency. As we have already seen, instead of fixing a definite rule for their orthography, and making them all conform to it, a plan which he has adopted with other classes of words, he has introduced into his dictionary two usages, that of Dr. Johnson, and what he calls "the more modern usage." In fact, he evidently felt difficulty in this part of his task, and shrank back from attempting any thorough reform. In most classes of words in which there was discrepancy, he not only followed but even went in advance of the more modern usage, by extending it to the whole class; in this case, he has only adopted this usage "in a few instances," and has there stopped short, having "in most words" followed Dr. Johnson's orthography.

By a comparison of the two dictionaries, we find that the following are the few instances alluded to:—

Johnson.	*Webster.*
Empeople	Impeople
Empierce	Impierce
Emplead	Implead
Empoison	Impoison
Encage	Incage
Encave	Incave
Enclose	Inclose
Encumber	Incumber
Endorse	Indorse
Endue	Indue
Engrain	Ingrain
Ensure	Insure
Enthrone	Inthrone
Embalm	Imbalm
Empale	Impale
Empannel	Impannel
Empassion	Impassion
Empoverish	Impoverish
Empurple	Impurple

The change is in accordance with the principles which we have laid down in every instance, except the two last. In these two words, *empoverish* and *empurple,* the prefix has not the force of *in*, but of *to make*. And this leads us to say a few words in regard to the prefix in this sense.

It is true that the Latin prefix *in* or *im* has occasionally the meaning of *to make,* as in *infatuate,* to make foolish; but these cases are extremely rare in good Latin, not amounting probably to half a dozen in all. As a general rule, the prefix with this meaning is either Saxon or Norman-French. When the root of the word is Saxon, we may conclude with some degree of certainty that the prefix also is Saxon, and when the root is French, that the prefix also is French.

The following is a list of the words of Saxon origin in which the prefix has this signification.

Embitter
Embolden
Embrown
Endear
Endrudge
Englad
Enharden
Enkindle
Enlight
Enlighten
(Saxon *enlihtan, onlihtan*)
Enliven
Enridge
Enripen
Enslave
Ensober
Entame
Enthrall

The following are those of Norman-French origin in which the prefix has this force.

Embellish (*embellir*)
Emblaze (*blasonner*)
Empoison (*empoisonner*)
Empoverish (*appauvrir*)
Empower
Empurple (*empourprer*)
Enable (Norman *enhabler*)
Endeavour (*endevoir*)
Enfeeble (*affaiblir*)
Enforce (*enforcir*)
Enfranchise (*affranchir*)
Engage (*engager*)
Englut (*engloutir*)
Enhance (Norman *enhauncer*)
Enlarge
Enchafe (*en* and *chauffer*)
Enmarble
Enrich (*enrichir*)
Envassal
Encourage (*encourager*)
Encrimson

It is of little consequence, however, to discriminate whether the prefix, when it has this signification, is Saxon or Norman. It was undoubtedly a Saxon prefix, as in the word *enlighten*, Saxon *enlihtan;* and it was also undoubtedly Norman, as in the two instances *enable* and *enhance*, which were in Norman respectively *enhabler* and *enhauncer*. And coming with both confluents into the combined stream, it became a thoroughly English form, understood in this sense both by Saxons and Normans. Hence a large number of words appear to have been formed with this prefix after the Norman Conquest, both from Saxon and Norman roots; and they are accordingly not to be found either in the Saxon or in modern French. Perhaps in the majority of cases, it would be nearest the truth to call the prefix Anglo-Norman.

However this may be, it is certain, that the prefix, when it signifies *to make*, ought to be written *en* or *em*, and not *in* or *im*, except it has come to us directly from the Latin. Dr. Webster is therefore wrong in writing *impoverish, impurple*, which ought to have been *empoverish, empurple*. He has made two similar mistakes in the words of Saxon origin, namely, in *embitter* and *embrown*, which he improperly spells *imbitter* and *imbrown*. The Doctor is consistent with himself, however, in regard to these four words, for he gives the prefix in each of them the signification of *in*. This is where his mistake lies.

In regard to the Saxon prefix, we may observe, by the way, that it is a common error among elementary grammarians and etymologists to represent the particle *en* as always denoting *to make*, and as being used both as prefix and affix, sometimes as both in the same word. Thus Wood, in his Etymological Guide, says, "In some words *en* is used at the same time as an affix and a prefix, as in *enlighten, enliven;*" and Connor, in his English Grammar, says, "*En* is sometimes used as an affix, as dark*en*, and sometimes, by a sort of tautology, it is put both at the beginning and the end of a word, as *em*bold*en*, *en*light*en*." It should be borne in mind that the termination *en* of so many of our words is the common termination *an* of the Saxon infinitives, and is distinct from the prefix *en*. As such, it is not necessary, nor is it possible, for us to assign one uniform signification to it any more than to the terminations of the Latin verbs of the several conjugations. At the same time, it is true that the force of all terminations of infinitives is *active* or *intensive*, generally speaking. It must necessarily be so from the nature of the verb. There is accordingly no tautology or reduplication in such words as *enliven*, *enlighten*, *embolden*, &c. The identity of form of the two particles is merely accidental. In the original Saxon form of the words, they differed from each other in spelling and pronunciation, the prefix being then written generally as at present, but sometimes *on*, and the final syllable being invariably *an*.

Before concluding our remarks upon this class of words, we would only further observe, that it is the duty of those who edit our standard dictionaries to endeavour as much as possible to fix the orthography of these words upon something like a firm and settled basis. Hitherto the dictionaries have rather perpetuated and multiplied the discrepancies than otherwise.

Most of them, as we have already pointed out, give references from one form of the word to the other. Webster's dictionary, we regret to say, contains many of the words in both forms, with a full definition to each, and without assigning a preference to either, as if to say that they are both right, and the person consulting the lexicon may take which he pleases. It may be said in defence of Dr. Webster, that it is the office of lexicographers to record the usage of our best writers, and that, in the present case, both forms of the words are authorized by such usage. But we reply that lexicography has gone far in advance of this stage of its existence. It is now understood and acknowledged by philologists, that the lexicographer should exercise a certain amount of discretionary power over the language whose usage and forms he records, except, of course, in the case of the dead languages; and the modern lexicographer is accordingly required to be a man of far higher attainments in philology, than the lexicographer of former days.

Further, one large dictionary, Craig's, which however does not profess to be an authority in orthography, not only makes no attempt to remove or diminish the number of these discrepancies, but declares them formally to be the usage of the language. "Some English words," says this dictionary, "are written indifferently with *en* or *in*." This is a very convenient mode of dealing with them. Mr. Craig seems like Dr. Webster to have found these words rather awkward customers, and to have resolved within himself that the easiest way to decide between the respective merits of the two forms, and to despatch the troublesome case, would be to pronounce them both right. We do not blame Mr. Craig for this, as his business was not with orthography, but with etymology, technology, and pronunciation; and in these respects he has been highly successful, although we hardly think his dictionary will supersede Dr. Webster's, as it was intended to do.

Milton was a great innovator in this class of words; he substituted the Latin form for the French one in almost every word in which he found it. Thus he wrote *imbellish, intire, imploy, imbrace, indanger, &c.* He seems to have had a mortal aversion to the French form of the prefix. He is of course not to be followed to the full length of so sweeping and indiscriminate a change. But we mention his orthography of these words to show that what Dr. Webster calls "the more modern usage" is not so very recent, after all, and that it has the sanction of one who was both a great writer and a great scholar.

We think it is much to be regretted that compositors should have so much control over the orthography of our language. As Landor makes Horne Tooke observe in his first imaginary conversation with Dr. Johnson, Milton was most careful and exact in his spelling, and his ear was as correct as his learning. From his accurate classical knowledge, he was well qualified to judge in such matters. The influence of his orthography upon the language could not have failed to be as beneficial as it would have been extensive, *if* the compositors had allowed him to exert such influence. But, alas, after the first edition of his great work, he was not permitted to retain his peculiarities in spelling, and in each successive edition the orthography has been conformed to the popular usage of the day, or rather to the usage of the various compositors, through whose hands it has passed. Not only has Milton's influence on our orthography been thus lost, but many have been the false quantities which have in consequence been introduced into the verses of the "Paradise Lost," and much the annoyance and trouble which these have occasioned, and still occasion, to the readers of the poet. These now-a-days form no inconsiderable fraction of the population of the whole civilized world, and their number is therefore a somewhat formidable one by which to multiply this trouble and annoyance. Why, in the name of wonder, cannot authors be granted the indulgence of seeing their words come out of the press as they sent them into it? Are they not better judges in these matters than the compositors, who, with all due respect to them, as a most useful class of men, are not, and do not aspire to be, philologists or lexicographers? It is quite impossible for any author to exercise a material influence upon the orthography of the language so long as the present system continues. And from whom are we to expect any influence at all, except from our great authors? For the recommendations of lexicographers, philologists, and grammarians can never be expected to influence the compositors; and even if this were otherwise, it would not be proper that the power of carrying out or rejecting such recommendations should be in their hands. Our writers are the guardians of the language in orthography and in everything else. The press should be the exact exponent of their usage, even in regard to the minutest matters, without the intervention of any controlling party.

There has been a sort of mutual understanding and league between the publishers and the public that the system which we condemn should be upheld. The remark which Landor puts into the mouth of Dr. Johnson immediately before the assertion of Horne Tooke, which we have just referred to, exactly characterizes the state of things that has prevailed in regard to this matter. Tooke has just said, "It is only such writers as you that can influence the public by your authority and example;" and Dr. Johnson replies, "Sir, if the best writers in England dared to spell three words differently from his contemporaries, and as Milton spelt them, he would look about in vain for a publisher." This still characterizes our great publishers to a considerable extent, though not to anything like the same extent as formerly. The number of publishers has greatly increased, and if one of them will not take a book another will; some of them are indeed themselves innovators in spelling. We think there will be very little difficulty now as far as they are concerned. And as to the public, the reading of works is not now confined to the few, as in former times, but is common to the many—the million. There is thus more scope for boldness and enterprise on the part of the publisher.

All that appears to us to be requisite in order to bring about a change in the present system is that authors should insist upon having their spelling followed in the printing of their works. Any orthographical reforms which they may adopt will then have their due influence upon the public, instead of being burked by the compositors.

4. "A singular instance," says Dr. Webster, "of inattention to analogy or uniformity, occurs in the formation of certain words from the Greek. Thus, in *anatomy, bronchotomy, cacophony, euphony, lithotomy*, and others, the final vowel of the Greek original is represented in English by *y*, which makes a syllable. But in *epitome, catastrophe, hyperbole*, and many others, the final vowel of the Greek is represented by *e*, which, in words of English origin, rarely or never makes a syllable at the end of a word. The consequence is, that the two last syllables are liable to be pronounced in one, *tome, trophe, bole*. Such a departure from analogy is very inconvenient. Besides, if the letter *y* closed the words in the singular number, the plural would be regularly formed by changing *y* into *ies*."

It should be observed, however, that the *y* represents a different Greek termination from the *e*. The Greek for *epitome* is still *epitome*, but the Greek for *euphony* is *euphonia*, and so of the others.

We have now considered all the principal recommendations of Dr. Webster in orthography, both as regards the radical changes which he proposed, and the discrepancies which he sought to rectify. These papers have already run to a length which we did not at first contemplate, and we must hasten to bring them to a close. We trust, however, that our remarks may not have been without utility, though we cannot expect that they have been of much interest, that being almost incompatible with the subject, as far at least as the general reader is concerned.

The two principal changes in our spelling, proposed by Archdeacon Hare, are so well advocated by him in his able article in the Philological Museum, to which we have so frequently alluded, that we need only refer our readers to that article.

One of the most effectual modes of introducing orthographical reforms would be by the publication of a spelling-book embodying them. After all that can be said about the influence of writers, we must mainly depend upon the instruction of the rising generation for the general introduction of such reforms. "If men of adult years," says Dr. Webster in his admirable Introduction, "do not choose to examine the subject of orthography, and correct their own practice, their children, learning the language as corrected, will become familiar with the true orthography, and familiarity and habit will lend support to truth and uniformity."

The enormous circulation which popular spelling-books have, and the enormous remuneration which they bring the authors and publishers, are notorious. The influence of these books must be correspondingly great. We will only give one instance, and that shall be the one which, though the most remarkable, is the least known in this country, as it has not occurred among us, but among our cousins on the other side of the Atlantic. We give it the more readily, as the author in this case was no other than the eminent lexicographer whose improvements in orthography we have been concerned in discussing. The very first books which Dr. Webster published, which he did when he was a little above twenty years of age, and engaged as a schoolmaster, were some compilations for the instruction of youth in schools. "These works," says Professor Goodrich in his memoir of Dr. Webster, "comprising a spelling book, an English grammar, and a compilation for reading, were the first books of the kind published in the United States. They were gradually introduced into most of the schools of our country, and to so great an extent has the spelling book been used, that during the twenty years in which he was employed in compiling his American dictionary, the entire support of his family was derived from the profits of this work, at a premium for copyright of less than a cent a copy. About twenty-four millions of this book have been published down to the present year, 1847, in the different forms which it assumed under the revision of the author; and its popularity has gone on continually increasing. The demand for some years past has averaged about one million copies a year. To its influence, probably, more than to any other cause, are we indebted for that remarkable uniformity of pronunciation in our country, which is so often spoken of with surprise by English travellers."

We will conclude with some eloquent remarks from Archdeacon Hare's article upon the practical utility of such reforms as those which we have been recommending:—

"And here I may be allowed to say a word in reply to those utilitarian wiseacres whose tongue is always tipt with the question, What is the use of a thing? What is the use, they are sure to ask, of throwing away time on such idle trivial inquiries as whether a word should be spelt with one set of letters or another? In answer to such persons it would not be enough to reply that matters of this sort have in all ages engaged the attention and excited the interest of philologers, and that the scholars of Europe, even down to the present day, have been perpetually taken up with discussions concerning the spelling of words in the dead languages. This, however, at all events, proves that such discussions are not out of place in a Philological Museum. Even Cobbett (Grammar, Letter X.) allows, that 'it is for monks and fellows of English colleges, who live by the sweat of other people's brows, to spend their time in this manner, and to call the result of their studies learning.' Besides, if such investigations, when applied to the classical tongues, are not deemed totally idle, though in that case they must be purely historical, and bear solely on the past, without any reference to the future, their practical value must at all events be greater, their inutility less, when they touch upon languages which are still spoken, and may tend to elucidate their nature, or perhaps even to improve their character. And as of all the works of man language is the most enduring, and partakes the most of eternity, and as our own language, so far as thought can project itself into the future, seems likely to be coeval with the world, and to spread vastly beyond even its present immeasurable limits, there cannot easily be a nobler object of ambition than to purify and better it. But to return to the question; what is the use of such improvements, in its lowest and most literal acceptation. It is allowed that in all departments of human activity the most desirable, because the most profitable thing, is to save labour; and it is not easy to estimate the sum of labour that will be saved to the teachers and learners of our language during the generations it is destined to last, by getting rid of, or even greatly lessening the anomalies which disfigure its pronunciation. Indeed, if I could but succeed in effecting even this one change, I should hold myself entitled to the gratitude of all the mothers and all the children in England. Improvements which are confined to single words are in this respect less beneficial. For the chief part of the words that need such are not of very common occurrence, and may well be kept out of the hornbook. Nor would this saving of labour be liable to the objections which may fairly be urged against many of the fashionable attempts to facilitate the education of youth. Wherever labour implies the exertion of thought, it does good, at least to the strong: where the saving of labour is a saving of thought, it enfeebles. The mind, like the body, is strengthened by hard exercise; but to give this exercise all its salutary effect, it should be of a reasonable kind; it should lead us to the perception of regularity, of order, of a principle, of a law. When, after all the trouble we have taken, we merely find anomalies and confusion, we are disgusted with what is so uncongenial: and as our higher faculties have not been called into action, they are not unlikely to be outgrown by the lower, and overborne as it were by the underwood of our minds. Hence, no doubt, one of the reasons why our language has been so much neglected, and why such scandalous ignorance prevails concerning its nature and history, is its unattractive, disheartening irregularity: none but Satan is fond of plunging into a chaos."

EXTRACTS FROM THE ANT'S BOOK, OR GUIDE TO A RATIONAL EDUCATION OF TEACHERS.

Translated from the German of C. G. Salzmann.

(*Continued from p.* 458.)

MY pupil had all the faults of which I complain before he came to me; how then can I take the blame of them to myself?

Granted that your pupil had these faults before he came to you. Why has he them still? Is not the correction of faults a principal part of education? If then this does not take place, is it not at least possible that the cause may lie in you?

For instance, your pupil came to you a delicate child, with whom little could be done; why then is he not yet stronger? Have you not heard of delicate children who were strengthened by a rational treatment? Do you know the means for strengthening delicate children? Have you made use of them? Your pupil had previously been spoilt—he is self-willed, obstinate, deceitful; but why is he this still, after he has been so long under your guidance? Have you let him feel the consequences of his self-will, in order thereby to bring him to reflect? Have you made him sufficiently sensible, that you are a man, he a boy, that you are superior to him in strength, experience, and understanding; and have you thus sought to bring him to the conviction, that he is dependent upon you, and must follow your precepts? Have you also always taken the requisite trouble to examine whether what he tells you is true, and to shame him by the discovery of his lies? You relate how you treat your pupils, what exhortations you give them, by what persuasive means you have sought to lead them, and complain that with all this you have accomplished nothing.

This may well be; it may also be that I may have nothing to find fault with in your account of your mode of treatment; but if I were to see you act, perhaps I should observe, nevertheless, that the cause of the ill success of your efforts lies in yourself.

It is not enough that we *say* something good, and act rationally; much depends also upon how we speak, and how we act.

The tone in which we speak to young people is of great importance. They are disposed to let themselves be led more by feeling than by reason. He, therefore, who can hit the right tone, the tone which is best suited to the youthful nature, and makes the most impression upon it, he will accomplish with a few words far more than another, who cannot attune himself to the right tone, with a long speech.

Thus, the tone in which many teachers speak to their pupils is too timid, too weak, it wants energy. As a horse soon perceives his rider's timidity by the trembling of his legs, and refuses him obedience, so young people soon feel by the timid tone in which the teacher speaks to them, that he is not a match for them, and they do not pay much attention to him.

With other teachers, the tone is too dry, too monotonous. To hear them, one would think they were reading their exhortations out of a book.

Such exhortations do no good; we cannot expect children to pay much attention to a connected discourse, to comprehend the meaning of it, and to reflect upon it. The tone, the gestures, the whole deportment of the speaker, must make the contents of the speech intelligible to them, or they will profit little by it.

"I go forth and weep," said a certain preacher *smiling*, at the close of the funeral sermon which he delivered over the grave of his colleague. And not a tear was shed by any one present. Did the fault lie in the hard-heartedness of the hearers? Not so—it lay in the smiling countenance with which the speaker said, *I go forth and weep*. Had he concluded with a weeping countenance, and held his handkerchief before his eyes, he would have accomplished more, even if he had said nothing.

Lastly, the tone of many teachers is too imperious; with a proud air they look down upon their youthful charge, like a high-born officer upon his company, and every exhortation, every admonition, has the form of a despotic command. What will be the effect of this? Dislike and obstinacy. Man, who was intended for freedom, feels a natural aversion to all harsh and arbitrary treatment, and he cannot be blamed if he mnifests it towards his despotic teacher.

I ought still to speak of the corporal's tone to which many teachers have accustomed themselves, who seek to give weight to their precepts and exhortations by thrusts in the ribs and blows with a stick. As, however, so much has already been said against it, and as its impropriety is generally acknowledged, I deem any further mention of it superfluous. I will only advise every young man who cannot guide youth otherwise than with thrusts and blows, that he should renounce teaching altogether, because he will not be happy, and will do no good in that vocation. Let him try to obtain a corporal's post, or the post of jailer; there he will be in his place.

What I have hitherto said will sufficiently prove that many teachers have to seek for the cause of their pupils' faults in themselves, because they are deficient in the skill requisite for correcting these faults.

Frequently, however, they really teach the pupils their faults.

"Well," most readers will think, "this is not the case with me; I teach my pupils their duty, and seek by my exhortations to make them good and active men." I willingly believe it; I take for granted, that among my readers there is no one who exhorts his pupils to laziness, lying, quarrelsomeness, and other vices. But it does not follow from this that they did not teach them vices. May we not teach vice by our example? Does not this act more strongly upon youth than exhortation? For instance, you enjoin industry, and nevertheless you are yourself lazy: you go with reluctance to your work, complain of the amount of your labour, often express the wish to be released from it; you exhort them to a love of truth, and nevertheless you lie yourself: you say that you want to visit a friend, and sneak away to the inn; you omit to give your lessons under the pretext that you are ill, and you are nevertheless not ill; you require peaceableness from your pupils, and are nevertheless always quarrelling with the persons who are connected with you. You appear to me like a grammatical master who can lecture well upon the theory of a language, but speaks and writes the language itself incorrectly. If his pupils do the same, can we not say of him that he has taught them the violations of the rules of the language.

Can we not further teach faults and vices by our mode of treatment?

I certainly think so; for example, if you punish severely every instance of mischievousness, of thoughtlessness, and of neglect, in your pupil, what have you taught him? Deceitfulness. It is necessary to his youthful nature to be occasionally mischievous, to act thoughtlessly, to neglect this and that; and if he knows that you would severely punish him for all this, what will he do? He will seek to conceal his faults from you, will deny them, will become a liar. If you misuse the confidence which your pupil places in you, if you let out the confessions which he makes to you as his friend, if you talk to him about them publicly, and shame him for them, what do you teach him? Secrecy. Can you in earnest require that this little fellow shall confide to you his secrets, when you do not know how to keep them? that he should show open-heartedness towards you, when you make it a crime in him? It is only the simpleton, the soft-pate who will do this; the boy who feels his strength and can judge of the irregularity of your behaviour, will withdraw his confidence from you, and will give it to persons who will better guard his secrets.

If you do not seek to satisfy the activity of your pupils, if to occupy them you put nothing else into their hands but books and pens; what do you teach them? A whole string of vices of which I am not inclined to write down here a detailed account. The desire for activity is there, and is a beneficent gift of the Creator; it is the spring which he has placed in the young machine. Books and pens are not able to satisfy it; for to use them reflection is requisite, and this is an exertion of the reasoning faculty, which in boys is still in embryo; and even if books and pens may in many cases be used without reflection, the constant use of them is too monotonous to be suited to boys,* who are fond of change. Consequently, boys who are chained down to books, and the writing-desk, have *ennui*. If it happens that some boys become used to it, the desire for activity is in them extinguished, they become idle and sluggish; if this does not happen, which is the case with most of them, the pent-up desire for activity breaks through, and runs into excesses. Who has taught them these? *The teacher*. Whoever wishes to know more of the various methods of teaching children's vices, I recommend to read *the Crab's Book, or the Guide to an irrational Education of Children.*

Thirdly, the teacher makes himself guilty of the faults and vices of his pupils by falsely imputing faults and vices to them.

To hear the description which many teachers give of their pupils, one might feel horrified and lose all desire to devote oneself to the beneficent work of teaching. There is not the least inclination in them to do anything useful, they show nothing but insupportable laziness, thoughtlessness, quarrelsomeness, deceitfulness, and malice; they are a lot of rough and uncultivated rascals with whom nothing can be done.

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* I use the word *boys* here and in what follows, because in writing this book I always had the mode of treatment proper for boys in view. The greater part of it, however, may, with some alterations, be applied to the education of girls.

The educated teacher smiles at this because he perceives that these vices exist for the most part in the brain of the teacher, who pronounces those things to be vices which are nevertheless necessary peculiarities of childhood.

What would be thought of a gardener who should complain in spring that he could find not a single fruit on all his cherry-trees, nothing but blossoms? Should we not pity and laugh at him?

Many teachers however do not act more rationally. They make it a crime in their pupils when these act as the child's nature will and must act, and require of them a behaviour that can only be the effect of cultivated reason, which in them is still small; they seek for fruits at the time of blossoms.

We will listen to a conversation on this subject between Corydon and his friend Mentor. There is nothing staid, says the former, in the manners of my pupils. Can I bring them to go about thoughtfully? There is nothing but hopping, jumping, and running.

Mentor.—Indeed? That is very gratifying. I should be extremely sorry if my pupils went about like puppets. The boy must hop, jump, and run, when he feels his strength.

Corydon.—Not a trace of reflection.

Mentor.—And do you wonder at it? What is it then in man which reflects? Is it not the reason? Whence then shall reflection come in boys whose reason has not yet developed itself?

Corydon.—They do nothing but childishness.

Mentor.—That is because they are children.

Corydon.—When the signal is given for lessons they go so slowly, so listlessly, that one loses patience; but if they are going to the play-ground, you should only see the alacrity with which they hasten to it, just as if man were intended for play.

Mentor.—Man is certainly not intended for play; but the boy, who is only becoming a man, is undoubtedly so intended. Gradually we must give him a taste for work; but we must not find fault with him if he cannot at once take pleasure in it.

Corydon.—And in lessons they are not still a moment.

Mentor.—That is because they are placed in a condition which is not natural to them. The healthy child is quiet only so long as he sleeps; at all other times he is in constant motion. You have nothing else to do but to reflect how you may use their restless disposition for the attainment of good ends. Give the little hands something to do, and the prattling mouths plenty of opportunities for speaking, and you will no longer find the unquiet spirits troublesome to you.

Corydon.—How much annoyance they give me by their malice and wickedness!

Mentor.—Malice and wickedness? I have not often observed these in boys. Give me an instance.

Corydon.—An instance! I could write a book full of them. Only imagine, for goodness' sake—yesterday I was taking my boys out,—my limbs still tremble when I think of it.

Mentor.—Well? What was it?

Corydon.—They were pelting one another with snowballs.

Mentor.—And that you call malice and wickedness.

Corydon.—Not so! But before I could look about me, one of them threw a snowball at me and hit me on the back, me, his instructor!

Mentor.—In order to annoy you?

Corydon.—For what else could it be?

Mentor.—Ay! That is just the point in which you gentlemen are so often wrong. In every exhibition of mischievousness and thoughtlessness you see malice and wickedness, and in this manner you offend against youth. Malice and wickedness are not natural to youth. When they show themselves you may be sure that they have been engendered in the young people by the preposterous manner in which they have been treated by grown-up persons.

Corydon.—But what other intention could the boy have had who threw at me except to annoy me?

Mentor.—To induce you to take part in the snowballing. What did you do then, when you had got the snowball?

Corydon.—I turned round and said, "Which is the rascal that threw at me?"

Mentor.—Well, what answer did you get?

Corydon.—None. I threatened to make them all go without their dinners, if they did not tell me the boy who had violated the respect due to me. No one answered. They all preferred eating dry bread for dinner to being any one of them so candid as to discover the boy who had offended me.

Mentor.—I do not see anything so abominable in that as you make out.

Corydon.—What! You can approve of a conspiracy which these villains made against their teacher!

Mentor.—I see neither conspiracy nor villains. One of the company in a fit of mischievousness pelted you—that they all knew. You, however, called this boy a rascal for so doing, who had forgotten the respect due to you. You threaten him by your look, and the harsh tone in which you speak, with a severe punishment. The boys all feel that in this you are doing wrong, and therefore do not betray their comrade. They rather deny themselves a dinner than deliver up a good but mischievous boy to too harsh treatment. Granting also that these boys did wrong in not discovering the mischievous one, did not you yourself give them cause for it by your severity? Do you know what I should have done if I had been in your place? I should have turned round and said *smiling*, "You seem to have a mind to try your hand with me. Who is the little hero who ventures to match himself against me?" In that case the boy would have stood out himself and have said, *I do!* Upon that I should have begun the fight with him, and when a few snowballs had been exchanged, I should have said somewhat seriously, "There, my little friend, that is enough; now we have matched ourselves against one another." He would thus have let fall the snowball which he had already raised to throw at you, and the whole scene would have ended to the general satisfaction of the company.

Here Mr. Corydon must break off. If I were to let him speak till he had done, his complaints would fill the whole of the space which I intend to devote to the Ant's Book. For whoever places the peculiarities of the childish nature in the class of vices, what will such a one not have to complain about?

To be Continued.

ON EQUATIONS OF THE FOURTH DEGREE, SOLVABLE AS QUADRATICS.

In books on Algebra, students often meet, under the head of Quadratics, with equations of the fourth degree, so framed as to be really solvable by the aid only of equations no higher than the second degree. In the management of such equations, learners generally experience a good deal of perplexity; for, except the equation be what is called a *recurring equation*, the books alluded to give him no principle to proceed upon; and he is, therefore, thrown entirely upon his own resources, having nothing to guide him but that sort of tact, ingenuity, and insight into the texture of the equation before him, which can be acquired only by practice and experience. I have thought it might be serviceable to the young student, and not wholly unacceptable to the teacher, if I were to give in the pages of this Journal a short specimen of a mode of dealing with equations of the kind referred to, which has somewhat of the character of a general principle, and which may be found effective even where the ordinary algebraic artifices fail.

I shall commence with a recurring equation, taking particular instead of general coefficients, solely for convenience of printing: it will be readily seen that the process is the same for all equations of the kind.

1. Given $x^4 - 6x^3 + 2x^2 - 6x + 1 = 0$.

Let the square root of the first member of this equation be extracted, the last step of the work being so far a departure from the common course as to secure a term in x^2 for the final remainder; as follows:—

$$\begin{array}{rl}
 & x^4 - 6x^3 + 2x^2 - 6x + 1 \; (x^2 - 3x + 1 \\
 & x^4 \\
2x^2 - 3x) & \overline{\quad\;\; - 6x^3 + 2x^2} \\
 & \quad\;\; - 6x^3 + 9x^2 \\
2x^2 - 6x + 1) & \overline{\qquad\qquad - 7x^2 - 6x + 1} \\
 & \qquad\qquad\;\; \underline{2x^2 - 6x + 1} \\
 & \qquad\qquad - 9x^2.
\end{array}$$

It thus appears that the proposed polynomial is equivalent to

$$(x^2 - 3x + 1)^2 - 9x^2;$$

and, *consequently*, that it is decomposable into the two quadratic factors—

$$(x^2 - 3x + 1) + 3x, \text{ and } (x^2 - 3x + 1) - 3x;$$

so that the given equation may be replaced by the two quadratic equations—

$$x^2 + 1 = 0, \; x^2 - 6x + 1 = 0.$$

2. Given $x^4 - 8x^3 + 3x^2 - 8x + 1 = 0$.

Proceeding as above, we have—

$$\begin{array}{rl}
 & x^4 - 8x^3 + 3x^2 - 8x + 1 \; (x^2 - 4x + 1 \\
 & x^4 \\
2x^2 - 4x) & \overline{\quad\;\; - 8x^3 + 3x^2} \\
 & \quad\;\; - 8x^3 + 16x^2 \\
2x^2 - 8x + 1) & \overline{\qquad\qquad - 13x^2 - 8x + 1} \\
 & \qquad\qquad\;\; \underline{2x^2 - 8x + 1} \\
 & \qquad\qquad - 15x^2.
\end{array}$$

Therefore the proposed polynomial is—

$$\left\{ (x^2 - 4x + 1) + \sqrt{15}.\, x \right\} \left\{ (x^2 - 4x + 1) - \sqrt{15}.\, x. \right\}$$

And consequently the two quadratic equations are—

$$x^2+(\sqrt{15}-4)\,x+1=0, \text{ and } x^2-(\sqrt{15}+4)\,x+1=0.$$

These two examples will suffice to show how recurring equations of the fourth degree may always be decomposed into a pair of quadratics.

3. Given $x^4+2x^3+2x^2-6x-15=0$.

$$\begin{array}{r l}
 & x^4+2x^3+2x^2-6x-15\ (x^2+x+1 \\
 & \underline{x^4} \\
2x^2+x) & \quad 2x^3+2x^2 \\
 & \quad \underline{2x^3+x^2} \\
2x^2+2x+1) & \qquad\quad x^2-6x-15 \\
 & \qquad\quad \underline{2x^2+2x+1} \\
 & \qquad\ -x^2-8x-16
\end{array}$$

In this operation the last step of the work is so managed as to secure a complete square, when signs are changed, for the final remainder. The peculiarity of the present mode of solution consists in *always* securing this form for the final remainder. The remainder must be either a *single* term, or *three* terms: if a single term, that term must be either a number, or something times x^2, the term in x, simply, being absent; if the remainder consist of *three* terms, it must, as above, be a trinomial square.

One or other of these conditions may always be accomplished, though not in a way to make us independent of the aid of a cubic equation, except when our biquadratic is really decomposable into a pair of quadratics with integral coefficients, or with a single quadratic radical in one of those coefficients; under other circumstances, a cubic equation is, in general, indispensable; but every equation of the fourth degree, at all entitled to appear under the head of quadratic equations, may be decomposed in the way here exemplified.

Returning to *Ex.* 3, we see that the quadratic factors of the polynomial are—

$$(x^2+x+1)+(x+4), \text{ and } (x^2+x+1)-(x+4);$$

so that the component quadratics are—

$$x^2+2x+5=0,\ x^2-3=0.$$

4. Given $x^4-x^3-8x^2+16x-8=0$.

$$\begin{array}{r l}
 & x^4-x^3-8x^2+16x-8\ (x^2-\tfrac{1}{2}x-1 \\
 & \underline{x^4} \\
2x^2-\tfrac{1}{2}x) & \quad -x^3-8x^2 \\
 & \quad \underline{-x^3+\tfrac{1}{4}x^2} \\
2x^2-x-1) & \qquad -\dfrac{33}{4}x^2+16x-8 \\
 & \qquad \underline{-2x^2+x+1} \\
 & \qquad -\dfrac{25}{4}x^2+15x-9=-(\tfrac{5}{2}x-3)^2.
\end{array}$$

so that the polynominal is the same as—

$$(x^2-\tfrac{1}{2}x-1)^2-(\tfrac{5}{2}x-3)^2$$

Consequently the component quadratics are—

$$x^2+2x-4=0,\ x^2-3x+2=0.$$

From these examples the student will perceive that all that is necessary, in applying the method, is a little careful consideration in the management of the last step of the extraction: he is to observe, first, whether there be any number which, put in the root's place, can cause either the first two, or the last two terms of the dividend reached, to become cancelled from the final remainder; and if so, to insert that number: a mere glance is sufficient to settle this point. If no such number exist, then he is to seek a number for the last term of the root, such that the final remainder may be a trinomial square, as in the foregoing Examples. The suitable number will, in general, be soon found if the equation be really composed of a pair of quadratics with integral coefficients.

5. Given $x^4+2x^3-16x^2+19x-6=0$.

$$\begin{array}{rl}
 & x^4+2x^3-16x^2-19x-6\ (x^2+x-\tfrac{1}{2}. \\
 & \underline{x^4} \\
2x^2+x) & 2x^3-16x^2 \\
 & \underline{2x^3+x^2} \\
2x^2+2x-\tfrac{1}{2}) & -17x^2+19x-6 \\
 & \underline{-x^2-x+\tfrac{1}{4}} \\
 & -16x^2+20x-\dfrac{25}{4}=-(4x-\tfrac{5}{2})^2
\end{array}$$

so that the polynominal is the same as—

$$(x^2+x-\tfrac{1}{2})^2-(4x-\tfrac{5}{2})^2$$

Therefore the component quadratics are—

$$x^2+5x-3=0,\ x^2-3x+2=0.$$

6. Given $x^4+4x^3-3x^2-8x+4=0$.

$$\begin{array}{rl}
 & x^4+4x^3-3x^2-8x+4\ (x^2+2x-2 \\
 & \underline{x^4} \\
2x^2+2x) & 4x^3-3x^2 \\
 & \underline{4x^3+4x^2} \\
2x^2+4x-2) & -7x^2-8x+4 \\
 & \underline{-4x^2-8x+4} \\
 & -3x^2
\end{array}$$

In this example the number -2 is suggested for the final term of the root, from the obvious circumstance, that the last two terms, $-8x+4$, of the dividend, thus become cancelled from the remainder, which is simply $-3x^2$. The proposed polynomial is therefore the same as—

$$\left\{(x^2+2x-2)+\sqrt{3}.\,x\right\}\left\{(x^2+2x-2)-\sqrt{3}.\,x\right\}$$

And consequently the component quadratics are—

$$x^2+(2+\sqrt{3})\,x-2=0,\ \text{and}\ x^2+(2-\sqrt{3})\,x-2=0.$$

I shall add but one more example, and that chiefly for the purpose of showing a certain advantage, I believe, peculiar to the present method:—

Given $x^4+2x^3+3x^2+x+3=0$.

$$\begin{array}{rl}
 & x^4+2x^3+3x^2+x+3\ (x^2+x \\
 & \underline{x^4} \\
2x^2+ & 2x^3+3x^2 \\
 & \underline{2x^3+x^2} \\
 & \qquad 2x^2+x+3.
\end{array}$$

Here, without proceeding further, we see that if the quadratic remainder now obtained were equated to zero, the roots would be imaginary; for four times the product of the extreme terms exceeds the square of the middle term. We may on this account at once conclude that all the roots of the given biquadratic equation are imaginary; for the polynomial is the same as—

$$(x^2+x)^2+(2x^2+x+3)=0;$$

that is, it is the sum of two quantities *necessarily positive,* whatever real value be put for x: it is impossible therefore that any *real* value for x can render the polynomial equal to zero.

I need scarcely suggest to the student, that a cubic equation may be treated as the biquadratic has been treated above; for it may be converted into a biquadratic form by merely multiplying each term by x. Y.

Notices of Books.

1. THE CLASS-BOOK OF POETRY. (London: *Published by the National Society.*)
2. STUDIES FROM THE ENGLISH POETS: A READING-BOOK FOR THE HIGHER CLASSES IN SCHOOLS, OR FOR HOME TEACHING. BY G. F. GRAHAM, AUTHOR OF "ENGLISH, OR THE ART OF COMPOSITION," &c. (London: *Longman & Co.*)

It would seem to be a very easy thing to select poetry for children, and yet out of the large number of selections that have been published we know of very few which are really suited to the wants of the young. They are defective either in the character of the pieces chosen, or in their arrangement, and not unfrequently in both. Such, we fear, is the case with the selection before us. The pieces are taken from none but our greatest poets, and are arranged under their names. It is true that their finest poems and passages have been selected; and as a volume of specimens illustrative of their works, nothing could be better. But, for these very reasons, the work is not suitable for a class-book of poetry.

It is not altogether easy to say what *kind* of poetry is best suited for children. Any one, however, who is accustomed to teach children and to observe narrowly their likings and dislikings, can tell in a moment whether any particular piece of poetry will please them or not. And such a person alone is qualified to make a selection for their use. One feels directly, on opening this selection, that it has not been made by such a person. The first requisite, of course, is that the poetry should be simple and intelligible to them. This being borne in mind, we should say, more particularly, that narrative and descriptive poetry are most interesting to the young; whereas many of the selections which appear for the use of schools—the present one, among others—contain principally didactic and philosophical poetry. It is obvious that the *arrangement* of a poetical class-book should be that of progressive difficulty.

Mr. Graham's "Studies from the English Poets" consists of extracts of considerable length from a few poets. He justly considers that the short extracts from a large number of poets which are to be found in most of our selections are too fragmentary to give any idea of the general style of the writers, or to create much interest in the mind of the reader. The selections are arranged under the several forms of poetry to which they belong. They are intended as models, to serve as materials for studies in poetical criticism. The following are the specimens selected by the compiler in the various forms:—

I. Epic.—The first four books of Milton's Paradise Lost.
II. Dramatic.—Shakspeare's Tempest, Macbeth, King John, and the Merchant of Venice.
III. Lyric.—Gray's and Collins's Odes.
IV. Didactic.—Pope's Essays on Criticism and on Man. Cowper's Conversation and Retirement.
V. Descriptive.—Thomson's Winter. Goldsmith's Deserted Village and Traveller.

The book contains, therefore, the masterpieces of the English language in all the principal kinds of poetry. It is, perhaps, to be regretted that there is nothing from Dryden.

Useful explanatory notes and examination questions have been added. Strikingly beautiful passages are printed in italics. This is, perhaps, not very complimentary to the taste and judgment of either master or pupils. We are of opinion, also, that far too much has been done in the way of "weeding," as the compiler calls it.

From this analysis of its contents, our readers will see that this volume is likely to prove a very useful reading-book for the upper classes in schools.

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1. KINGS OF ENGLAND: A HISTORY FOR YOUNG CHILDREN.
2. LANDMARKS OF HISTORY. ANCIENT HISTORY, FROM THE EARLIEST TIMES TO THE MAHOMETAN CONQUEST. BY THE AUTHOR OF "KINGS OF ENGLAND," &c. (London: *John and Charles Mozley.*)

THE first of these works varies little from the common type of school histories, except that it is professedly what most of them are in reality—a history of the *kings* (including the queens), not a history of the country. It avows this as its object both in the title and preface: "There has been less attempt than is usual in such works to gather together numerous anecdotes. * * * Neither has any space been bestowed on manners, costumes, &c., since these may best be learnt from the numerous prints within reach of every one, and they are more suited to amuse the play-hours of an intelligent child, and form an agreeable supplement to historical studies, than to be regarded as a part of the history itself." We are not sure that the compiler has not here placed the cart before the horse. We incline to believe that by far the most important part of history is that which relates to the progress of the *people* in the arts of civilized life. However, we agree with him that the lives of the sovereigns must form the framework of the instruction in history, and that it is advisable to set this up first, before we proceed to fill in the substantial body of the structure of historical knowledge. The fear is that teachers and parents may rest satisfied with the framework alone.

The other volume, written by the same compiler, is intended to supply the connection between the different branches of ancient history, with an especial view to the better understanding of Scripture history and the growth of the Church. As the title indicates, the volume contains, with few exceptions, only the most prominent events. These are put together in a simple and natural style. The work will, therefore, furnish a class-book for those schools in which only a general acquaintance with the subject can be attempted.

PRACTICAL ENGLISH COMPOSITION. PART II. BY RICHARD HILEY, PRINCIPAL OF THE LEEDS COLLEGIATE AND COMMERCIAL SCHOOL, AUTHOR OF "AN ENGLISH GRAMMAR," "LATIN GRAMMAR," &c. &c. (London: *Longmans.*)

THIS book forms an exception to the general run of works professing to teach the art of composition. It does not attempt to teach the pupil to write essays according to a set form, but contains a progressive series of *practical* exercises, and to assist the learner in doing these exercises, models are given, with full explanations, and a great deal of information is communicated upon matters connected with the structure of language (both prose and poetry). The aim of the author has been to devise a course of instruction which, by supplying the pupil with proper aliment, should gradually induce in him a habit of evolving his own sentiments in appropriate language. The work is divided into five books. Book I., after an introductory chapter, contains remarks and exercises on the structure and sequence of sentences, on variety of expression, and on classification and arrangement. Book II. contains remarks and exercises on narration. Book III. relates to figurative language, poetry, and the mutation of poetry into prose, or what is usually called paraphrasing. Book IV. contains remarks and exercises on description, with an introductory chapter on taste. Book V. is devoted to description of character. The principal exercise, both in narrative and descriptive subjects, is the reproduction of model extracts from good authors, and the subsequent comparison of the pupil's work with the original. This must always be one of the most useful exercises in forming the style of the young student. We would even recommend it to adults who are anxious to improve their style. We know of many cases in which it has been practised with the greatest benefit. If the passages for reproduction are chosen from a sufficient variety of authors, the student may copy the excellencies of each, and still form an independent style for himself. The exercises in paraphrasing are upon the plan of the Rev. John Hunter, as explained and illustrated in his Grammar and from time to time in this journal. This should have been acknowledged.

We think this book particularly suitable for pupil-teachers.

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1. A NEW GRAMMAR OF THE FRENCH LANGUAGE. BY DR. DUBUC. SECOND EDITION. (Edinburgh: *Robert Seton.*)
2. THE CHILD'S FRENCH FRIEND; BEING GRAMMAR, EXERCISES, AND VOCABULARY, FOR THE USE OF CHILDREN. BY M. A. ALLISON. NINTH EDITION. (London: *Simpkin, Marshall, & Co.*)
3. AN EASY GUIDE TO FRENCH CONVERSATION, ON A NEW PLAN. BY J. G. E. MACLEOD, B.A., UNIV. FRANCE, MASTER OF MODERN LANGUAGES AND LITERATURE IN THE EDINBURGH ACADEMY. (Edinburgh: *Robert Seton.*)

DR. DUBUC'S work is fit to take its place among the best French grammars that have been published. In fact, we see very little difference between it and some of them—Delille's, for instance. The only great difference that we observe between it and Delille's is, that it gives the syntax in English, and not in French, as Delille has done. This is no improvement, for by the time the pupils are prepared to understand the syntax, they are prepared to read tolerably easy French, and it is both interesting and useful to them to have the syntax written in that language. Delille's plan has accordingly met with general approbation. Two differences of less importance are, that the exercises are not given in so convenient a form in this work, and that it is smaller in size, and we must also add, in price, than Delille's.

The "Child's French Friend" is an edition of a little book that has been published upwards of a dozen years. It is written upon the effete style of books for the young, namely, that of Question and Answer. But the method of teaching which it recommends, and to which it is adapted, is a correct one, namely, that of requiring the pupil to prepare written exercises, instead of committing everything to memory according to the plan of the

Abbé Bossut's little works; and we are, therefore, not surprised to see that it has reached the ninth edition.

The author of the "Easy Guide to French Conversation" prefaces his book in the usual style, with a lamentation that nothing really good and practical in this line has hitherto appeared, and with a hope that "the following pages" may be found to supply the desideratum. But we have not been able to perceive any striking difference between this and other books of the same sort, except, perhaps, that it gives the conjugation of the regular and irregular verbs more fully than most of them.

HAND-BOOK OF NATURAL PHILOSOPHY AND ASTRONOMY. BY DIONYSIUS LARDNER, D.C.L., FORMERLY PROFESSOR OF NATURAL PHILOSOPHY AND ASTRONOMY IN UNIVERSITY COLLEGE, LONDON. SECOND COURSE: HEAT—COMMON ELECTRICITY—MAGNETISM—VOLTAIC ELECTRICITY. (London: *Taylor, Walton, and Maberly.*)

THE first course of this Hand-book appeared in 1851, and was noticed in the number of this journal for September in that year. It was announced in the advertisement to that volume of the work that the second course would embrace heat, electricity, magnetism, astronomy, and meteorology. But it will be seen that this plan has been departed from; that astronomy and meteorology have not been included. In explanation of this, the publishers state that it was found that these subjects, treated with the fulness and clearness commensurate with their importance, would swell the volume to an objectionable bulk; and they have accordingly determined that astronomy and meteorology should be consigned to a separate volume, which is to form the third and concluding course of the Hand-book. Before we proceed to notice the present volume, we would just remark by the way, that it is rather a wide stretch of the meaning of the word "hand-book," to apply it to a work consisting of three volumes. We know of *hand* books which could not be held in the hand or even hands for any length of time by any other than a giant. But a hand-book in three volumes, in order to save the title, would require not merely a giant, but a monster—a three-handed one. This is a matter of no great importance, but it would be as well to put a stop to it before Hand-book comes to mean a whole library.

We may again state that the work is designed for "those who desire to obtain a knowledge of the elements of physics without pursuing them through their mathematical consequences and details," and that it has also "the object of supplying that information relating to physical and mechanical science which is required by the medical and law student, the engineer and artisan, by those who are preparing for the universities, and, in short, by those who, having already entered upon the active pursuits of business, are still desirous to sustain and improve their knowledge of the general truths of physics, and of those laws by which the order and stability of the material world are maintained."

The present course is divided into four books, corresponding to the enumeration of subjects in the title-page. In the book on Heat, the author treats of thermometry, dilatation of solids, gases, and liquids, calorimetry, liquefaction and solidification, vaporization and condensation, conduction, radiation, combustion, animal heat, and the sensation of heat. In the book on Magnetism, Dr. Lardner views his subject under three principal heads—magnetism by induction, terrestrial magnetism, and magnetization. Under Common Electricity, there are chapters on electrical attractions and repulsions, conduction, induction, electrical machines, condensers, and electrophorous electroscopes, the Leyden jar, laws of electrical forces, mechanical, thermal, luminous, physiological and chemical, and magnetic effects of electricity. In the part referring to Voltaic Electricity, the author treats of simple voltaic combination, voltaic batteries and currents, reciprocal influence of rectilinear and circulating currents and magnets, electro-magnetic induction, influence of terrestrial magnetism on voltaic currents, voltaic theory of magnetism, reoscopes and reometers, thermo-electricity, electro-chemistry, electro-metallurgy, electro-telegraphy, calorific, luminous, and physiological effects of the voltaic current.

Upon each of these divisions of his subjects, Dr. Lardner has written with his usual clearness and precision of style. And he has duly recognized the value of pictorial illustrations in the explanation of matters of physical science. There are upwards of two hundred such illustrations in this book, and they are all well executed. He has also embodied all the most recent discoveries and inventions in the sciences of which he treats.

Reference to the subjects in the volume is greatly facilitated by the plan of prefixing distinct titles to every paragraph, as well as by a copious table of contents and an index. It is announced that a general index to the three courses will be annexed to the concluding volume.

A copy of this volume should be placed in every school library, in order that the teachers may refer to it in preparing their lessons on any of the subjects included in the course, for which purpose we know of no book which would be more useful.

THE ILLUSTRATED LONDON DRAWING-BOOK. EDITED AND ARRANGED BY ROBERT SCOTT BURN, M.S.A., AUTHOR OF "PRACTICAL VENTILATION," "HINTS ON SANATORY CONSTRUCTION," &c., &c. (London: 227, Strand.)

THE publishers of this book possess facilities for bringing out such a work at a cheap rate which perhaps no other firm can command. We refer to the illustrations. Of these there are about three hundred (drawings and diagrams together). As might be expected, they are executed in first-rate style. They form decidedly the most important and most interesting feature of the book.

The following is the arrangement adopted:—The *first section* is taken up with elucidating the practice of pencil-sketching, as applied principally to decorative purposes, and as forming the groundwork for more extended practice in the higher branches of art. The *second section* is devoted to the practice of figure and object drawing. The *third section* treats of perspective, its principles and practice, applicable alike to the delineation of geometrical forms and of natural objects: *Isometrical Drawing* is treated of under this section. The *fourth section* gives easy rules for sketching and drawing in crayon, oil, and water-colours. The *fifth section* is designed to meet the wants of students who are desirous of becoming acquainted with the readiest means of multiplying their sketches. Short and easy directions are given in this section for engraving or etching in copper or wood. This general arrangement is sufficiently progressive; but we think that under each separate division the exercises become difficult far too rapidly. However, taken all in all, we think this is decidedly the best elementary drawing-book that has yet appeared.

Correspondence.

TRANSLATIONS OF THE CLASSICS.

The remarks of a correspondent, "R. M.," in your last number, p. 479, will perhaps make some masters attend to a matter which they may have overlooked or not chosen to notice—the low price at which translations of the Greek and Roman authors can now be had; and particularly those which are read in schools. Indeed, there would be no chance of such books paying the expense of paper and print, if schoolboys did not buy them. Boys are the chief purchasers of the cheap translations of the classics, and they were intended for them; and accordingly they are made cheap to suit a body of customers whose purse is not very long, but whose demand is constant. It is true, as your correspondent states, that these translations are much used in schools.

A good translation is a rare thing; it is a work that requires much time and labour, and better abilities, more learning, and more taste, than are often combined in one person. I have not been so fortunate as to see many that have more than very moderate merit. The boys, then, generally use rather indifferent versions, when they use any; and idle boys will get their lessons by them. However, it is not difficult, even in classes of more than thirty, to find out who get their lessons by the aid of a translation and who do not. If the teacher is vigilant, and examines the boys well in a lesson of reasonable length, he will easily discover how ill those boys learn it who get their lessons in the slovenly way which your correspondent describes. The proper use of a good translation for a boy, is to consult it after he has done his best to master his lesson; and if translations were always good, and always used in that way, I should recommend them. However, the translation buyers are generally the lazy, who use them to save trouble; and that is the fact which the teacher has to deal with.

It is a good practice for the master himself to translate every lesson to the boys in the higher classes, after he has heard them translate it and examined them on it. He may do this on the same day, or, if he thinks it better, the day after, before the new lesson begins. Such a translation, delivered orally, will be better for the boys than the published translations. After the whole lesson has been carefully examined, the master, with a little practice, will be able to give the pupils a sufficiently good version to correct any little things that may have been overlooked, and finally to bring the whole lesson in its full meaning before the pupils, who are supposed to have now mastered all the particulars that are necessary to its understanding. I have always found all the pupils, even in a class of forty and upwards, exceedingly attentive to these translations. For younger boys, I have found no method so good as to translate for them orally on one day the lesson that they have to prepare on the next. Such assistance is necessary at first; but it may be diminished as the boys' knowledge improves. It is no objection to say that such help will make them less diligent in studying the lesson. That is not the fact. If they are well examined upon the lesson the next day, they will work at it. As to the lesson being studied in the master's presence, that is the best plan, I think, with young boys, as far as it is practicable; but with older boys it is not practicable, and it would do harm.

Your correspondent, who is fully aware of the great use that is made of translations, recommends the only possible remedy for the evil. The daily examinations on the lessons should be so strict that the translation gentlemen must be detected, if they trust to their translations only. In some large schools there are examinations every month or six weeks, which are very useful if they are not made too long. An examination at the end of every half-year seems to me necessary; a strict and careful examination, both orally and on paper. No school can be well managed without this. It will put those in their right places who rely solely on translations.

There are always some boys of the better kind who will receive advice. If their object and ambition is to become good scholars, they will take a teacher's advice not to learn their lessons by the aid of translations. At any rate, when a master knows that translations are used for getting lessons, I think that he should let his pupils know that he knows the fact; and he should tell them what he thinks of it. I would not take the translations from the boys, unless they use them at the lesson contrary to order. I have often tolerated a single translation being in the room when the upper classes say their lessons, for the purpose of turning to it occasionally to see how a difficulty is managed, and the result often is to condemn the version, and even to ridicule it, which many translations well deserve. As to knowing how many (or if any) translations are in a room during the lesson, I suppose it is not necessary to explain how any teacher may discover such books, if he likes. If there were fifty boys, I could detect any translation-book easily. When any is allowed to be present, for the purpose already mentioned, it lies open, and is seen. We have some tolerable prose versions of prose writers. We have some execrable prose, prosy, and prosaic versions of the poets. These should be pitched into the fire, or the sea, or any other place from which they will not emerge. A prose translation of a Greek or Latin poet, and especially of the Greek dramatists, even if it were well done, would be intolerable to any man of taste; and if ill done, can we imagine a greater monster? A thing of art, of beauty, of which the form is as essential to its existence as the matter, is converted into an unmeaning, lifeless, and deformed mass. These prose translations of the poets should be banished from schools by all possible means; and among these means, the exhortation and advice of the master would have effect with some of the boys. A poetical translation does not affect to translate the words, but to give the meaning in a poetical form. It may sometimes fail to do this, but if the attempt is made by a competent hand, such a translation has its uses. For instance, I think that Conington's translation of the Agamemnon is a good book for a student. It helps him to the understanding of the play, though not to translate it in a class. It ought not to do this, it was not intended to do it, and it is contrary to the nature of the thing that it should do it.

Your correspondent says something on notes; and most teachers will assent to part of what he says. As to the question whether notes should be used at all, and whether they should be at the end of the book or at the foot of the page, there are different opinions. Notes are of little use for very young boys; and if the master gives them the proper assistance in preparing the lesson, they are not much wanted. Notes at the end of a book are very inconvenient, and the general opinion is in favour of putting notes at the bottom of the page, if there are any. An idle boy may turn his eye from the text to the notes while he is saying his lesson, and this is a good objection to them. But I have generally found that idle boys don't read notes at all, whether they are at the end of a book or at the foot of the page. Probably such boys seldom do more than glance their eye at foot-notes, if they are called on to translate in class.

The objection to Anthon's editions, especially those which have notes at the foot of the page, is a sufficient objection; but the strength of the objection is in the quality of the notes. This laborious gentleman levies contributions on all the notes that he can find, and transfers them to his own pages without any judgment. There is a great difference between the notes of a man who has studied an author well, and the notes of a man who has not studied his author, and merely appropriates the labour of others. It is an infallible test of good notes that they will help a student to the meaning of the author, but not to translate him. Good notes require to be read as carefully as the text. When the student has looked at the text and discovered a real difficulty, he ought to find something in the notes that will help him—not help him so as to save him all trouble, but so far at least as to diminish the difficulty. The help may consist in explaining the matter of the text in a general way, whether the difficulty be geographical, historical, or in the expression, or in some particular word. There are some cases where no help can be given except by translating the passage; but these are rare cases. Good notes will help a diligent student, and will be useless to one who is not diligent. Bad notes are of no use to diligent students; and they only help idle boys, by giving them assistance plentifully in the way of bad versions of passages in which there is often no difficulty at all. Such is the character of many of Anthon's notes—inaccurate, tasteless versions, in a language hardly English; versions so bad that it is often enough to cause a laugh to read one of them aloud before a class. Some of these books have been edited again in England, and unluckily have been much used. They have done more mischief than bad translations, for they contain a great deal of bad translation, and an enormous amount of useless matter. It will be one sign of improvement when they go out of use. Dr. Anthon's countrymen cannot owe him much obligation. They have enough of bombast and bad taste in their speaking and writing without his helping them to more. The best way to correct these faults would be a careful study of a few good classical writers without Dr. Anthon's notes, or with any useful notes.

G. L.

ON THE NATURAL HISTORY OF THE ANT.

Sir,—At page 360 of your last volume, you published a letter from "A Subscriber," in supposed correction of a popular error contained in an extract from Mr. Nicholl's recent work on the Book of Proverbs, reviewed in a previous Number. As your correspondent's letter contains more error than it corrects, and as no one else has noticed it, I trust you will find a place for the following remarks:—

"A Subscriber" says, "Let me point out that the ant is not a granivorous, but a carnivorous animal." And again, further on, "Nor let it be supposed that the oriental ants differ in their habits from those of the west. The formica is carnivorous all the world over." Now, in this matter, your correspondent is at issue with the best writers on entomology, as well as with the testimony of common experience. For instance, the author of the article on the Ant in the Penny Cyclopœdia (Vol. ii. p. 62), declares, "Some species will eat insects, fruits, and almost anything eaten by other animals; but honey dew is the most universal favourite with all the species, particularly the excretion of the various species of aphides." And Mr. Westwood, now President of the Entomological Society, while expressing his own opinion that animal matter forms the staple of the ant's food, observes that "the food of the species which inhabit different localities no doubt varies; and there is little question that besides honey dew, most of them are fond of sugar, gums, and all the sweeter exudations of trees." Hence it is plain, that the term omnivorous would better apply to the ant than that of carnivorous, though neither is sufficiently precise, and it may be deemed advisable to coin some such word as Enchymophagous as more suitable; or perhaps Saccharivorous would answer the purpose. I should have thought that no one at all conversant with the natural history of the ant, could be ignorant of the destruction of the sugar plantations in the West Indies by *Formica saccharivora;* or of the more harmless depredations of *Myrmica domestica* (a minute yellowish species, originally, I believe, imported) in our ladies' store-rooms. Mr. Westwood refers to Drury's account of the ravages of ants in tropical climates, especially upon saccharine matters (Classification of Insects, vol. ii. p. 229, note); and he mentions a Mexican species which actually elaborates a kind of honey, and discharges it into cells analogous to those of the hive bee (p. 225, note). It will presently appear that Messrs. Kirby and Spence go still further; and that a recent discovery in India has caused these distinguished entomologists to doubt whether, after all that has been said to the contrary, some ants may not be truly granivorous.

Mr. Nicholls is also accused of "gravely repeating the old delusion" of the ant's *foresight,* "long since found by naturalists to be erroneous, though still maintaining its ground, not only in the vulgar mind, but among educated people;" and likewise of "adding some new and striking particulars not hitherto brought to light." The belief of the ant's foresight, if an error, is undoubtedly as old as the age of King Solomon, and I will leave it till I come to your correspondent's opinion of his wisdom. With respect to the other alleged errors, I am really astonished at the unsparing censure, since there is scarcely a statement in the extract from Mr. Nicholls that I have not met with in the works of the first naturalists. Any one who turns to the extract, given at length in p. 270 of the July Number, will see the justice of what I say. The following is your correspondent's main objection:—"Mr. Nicholls even goes the length of saying, that *when the grain happens to be too heavy, those that have no burthen cut it in two and take the half upon their own shoulders.* There would be small chance, in this case, for the embryo inside the supposed grain of corn. If the habit were, indeed, very general, the mutual kindness of the insects would end in the extermination of their race." Thus your correspondent. Now, there is not the least reason for supposing that Mr. Nicholls mistook embryo ants for grains of corn. On the contrary, the context shows pretty plainly, that by the burthens he meant no "supposed grains," but veritable grains carried by the ants to their nests. For what purpose, then, are they borne, it may be asked? This, I venture to think, has not been satisfactorily ascertained, at least by our own naturalists. According to Mr. Rennie (Insect Architecture, p. 272), "When within reach of a corn field, they often pick up *grains* of wheat, barley, or oats, and carry them to the nest as building materials, and not as food, as was believed by the ancients." As regards the assistance said by Mr.

Nicholls to be rendered by these wonderful little creatures to each other, let us have two of the greatest modern authorities, to which I have already referred:—"Upon examining ants," remarks Mr. Westwood, p. 128 of the volume of the Brit. Cyclopœdia before quoted, "it is found that the labourers, if unoccupied, are equally ready and willing to put their hand (such hand as it is) to a work which is requisite for the welfare of the community; and the confidence with which they all go in quest of assistance, and the readiness with which they receive it, are among the most beautiful traits in their character." Messrs. Kirby and Spence, in like manner, (Introduction to Entomology, 6th edition, volume ii. page 55,) "Whoever attends to what is going forward in the neighbourhood of one of their nests, will be pleased to observe the readiness with which they seem disposed to assist each other in difficulties. *When a burthen is too heavy for one, the others will soon come to ease it of part of the weight;* and if one is threatened with an attack, all hasten to the spot to join in repelling it." I have never met with an instance of ants cutting a heavy grain or other burthen in two to divide the weight between them, a statement which would seem to have arisen from Mr. Nicholls misunderstanding the words of Messrs. Kirby and Spence, which I have just quoted. And the examples subsequently given by the entomological partners agree with the general statement of Mr. Westwood, "that, in this day, any one who attends to the common garden ants, may often see a large caterpillar, earthworm, or other goodly prize, borne lightly off by the *united strength* of twenty, thirty, or forty, at which a single individual had been trying in vain for half an hour." But though in this single instance I believe Mr. Nicholls to be incorrect, I am sure I may safely affirm in words used by Messrs. Kirby and Spence on another disputed question, that "it does not attribute more sagacity and foresight to these insects than in other instances they are found to possess."

And now I come to the gravest of "A Subscriber's" charges, that which denies the accuracy of the knowledge possessed by the most learned of the sons of men, to say nothing of his being an inspired writer. "Go to the ant, thou sluggard; consider her ways, and be wise; which having no guide, overseer, or ruler, provideth her meat in the summer, and gathereth her food in the harvest." "The ants are a people not strong, yet they prepare their meat in the summer" (Prov. v. 6—8; xxx. 25). Your correspondent boldly pronounces the matter of fact in this famous proverb to be "a fiction," and speaks of it as "an illustration founded on the shifting sands of a popular misconception that cannot stand any longer,"—a lame way at best of getting out of a difficulty. I suspect his explanation has *no* sort of foundation. He is apparently blind to what Mr. Nicholls was really directing the attention of his readers, viz., "the prudence and foresight of the ants in making use of the proper seasons to collect a supply of provisions sufficient for their purpose." This is the very language of Messrs. Kirby and Spence (Introduct. p. 40), who argue that there is nothing in Solomon's words necessarily implying the *storing up* of provisions, but only that they are careful to gather their food during the most plentiful season of the year, thereby showing the wisdom of using advantages when offered. "Thus interpreted (they continue) the words without violence will apply to our European species, as well as to those which are not indigenous." But they had been careful to remind us, previously, that "till the manners of exotic ants are more accurately explored, it would be rash to affirm that no ants have magazines of provisions; for although during the cold of our winters . . . they remain in a state of torpidity . . . , yet in warmer regions, during the rainy seasons, when they are probably confined to their nests, a store of provisions may be necessary for them. Even in northern climates, against wet seasons, they may provide in this way for their subsistence and that of the young brood . . . .; else why do the ants carry worms, living insects, and many other such things into their nests? Solomon's lesson to the sluggard has been generally adduced as a strong confirmation of the ancient opinion: it can, however, only relate to the species of a warm climate, the habits of which, as I have just observed, are probably different from those of a cold one; so that his words, as commonly interpreted, may be perfectly correct and consistent with nature, and yet be not at all applicable to species that are indigenous to Europe. The editor of the "Pictorial Bible" (Comment. on Prov. xxx. 25) suggested something similar to the above, as a not improbable discovery resulting from more careful observation in the East.

After quoting Messrs. Kirby and Spence to prove that the sacred "text is not committed to any of the opinions which have been disputed, and stating that even if it were so in this single point to which it seemed more particularly to tend, *it may be a fact, and not merely an accommodation to current opinion;*" he proceeds: "In fact, the opinion as to the ant storing *food* (not *corn* particularly) seems to have originated in the East, and *from thence* we have no information that disproves it. *There* the opinion is still entertained, as is the proverb, 'What the ant collects in a year, the monks eat up in a night.' We regret that, while in the East, our attention was not so called to the subject as to lead to careful observation; and all we can state is, that in very mild extra-tropical climates of Asia, where frost is seldom known in winter, the ants do not make their appearance in that season, so that they must require stored food, unless the cold of even such mild winters suffices to render them torpid." In the "Pictorial History of Palestine" (Nat. Hist., p. ccccxxi.) the same author reports ants to be exceedingly numerous in the Holy Land, and he mentions a small red ant as abundant at Bethlehem (identified with *Formica rufa* by Dr. Kitto, who, however, in all probability meant *Myrmica rubra*, this having been misnamed *Formica rufa* in the "Règne Animal" of Cuvier, and the true *Formica rufa*, the common pismire, also called the horse ant and wood ant, being the *largest* of our native species.)

What has since been learnt of at least one oriental species fully justifies the anticipations of the last-mentioned critics. The President of the Entomological Society shall again be our informant: "The only other genus that we shall notice is *Atta*, which we introduce for the purpose of mentioning some circumstances which are doubly interesting to the naturalist; first, from their own nature; and, secondly, from the confirmation they afford to a long-disputed question, and *the necessity which they prove to exist of scrupulously attending to every circumstance of time and place in our endeavours to reconcile the statements of ancient naturalists with the results of our own inquiries.* From the days of Solomon it has been generally considered that the storing up of food by the ant was for the purpose of ensuring against want during the winter. When, however, observers of nature began to study the habits of our northern European species, it was soon discovered that ants lie torpid during the winter, and consequently Solomon's statement was regarded to be but a figurative expression. The fact was overlooked that in climates similar to that in which Solomon's observation was made, the winter is not sufficiently severe to render the insects torpid; although by some more philosophical observers (Kirby and Spence) it was suggested that in warmer regions a store of provisions *may be* necessary for them. These ingenious suggestions have now been proved to be perfectly correct, by the publication of Colonel Sykes's account of the habits of an East Indian species of the genus *Atta* (*A. providens*, Sykes, since named *Pheidole providens*, Westw.), which lays up a store of grass-seeds (*Panicum*) in the months of January and February sufficient to last until the middle of the year. Indeed, on the 13th October, after the closing thunderstorms of the monsoon, he found this species in various places employed in drying the remains of their stores which had been wetted by the rain." (Brit. Cyc. of Nat. Hist., vol. ii. 1836, Art. "Formicidæ.") In a subsequent publication (Classif. Insects, vol. ii. p. 222, note, 1840) Mr. Westwood has expressed his doubts whether the store was intended for food, on the two-fold ground, first, that a very large quantity remained after the season of dearth was over; and, secondly, that the known nutriment of ants consists of animal and vegetable *fluids*, and not of grain. But, on the other side, I may adduce the still later authority of Messrs. Kirby and Spence, who (in a note to their last edition, 1843, vol. ii. p. 39) observe, "that it does not seem easy to assign any plausible reason for the original collecting and storing, and subsequent drying and airing, of these seeds, except on the supposition of their being intended in some way for food; and though we have no previously recorded instance of ants feeding on any other vegetable substances than such as are saccharine, yet, as all our experience proves how constantly in entomology exceptions are occurring to supposed general laws, there seems good reason to believe that this is one of them." They then refer to the remarks of the Rev. F. W. Hope on this subject in the "Transactions of the Ent. Soc." (London, ii. 211).

And now I should hope enough has been brought forward to prove even to "A Subscriber" himself how incompetent he was to censure another in the matter on which he addressed you; and I must express my regret that his letter obtained admission in your pages. I consider that his remarks have a mischievous tendency, and would offer my remonstrance against his manner of treating the Scriptures, not that it is peculiar to him—and, unhappily, the prevalence of it argues, I fear, with other signs, a spirit the reverse of humble. Dr. Harris (Nat. Hist. of the Bible, Art. "Ant,") quotes, apparently with approbation, Mr. Durell's comment on Prov. vi. 6, "The Scriptures are not to be considered as unerring guides in natural, although they are in moral and divine, matters." To this broad statement I for one cannot accede; and I believe the following opinion (I think it is Prof. Sedgwick's) a much sounder one, viz., that "the Scriptures were given to *teach* us, not physical science, but religious;" which last is, according to them, the only true knowledge. Between these two opinions there is a very considerable difference. We shall avoid the error of the Hutchinsonian school of seeking to draw from popular language the occult principles of science if we act upon the view last mentioned, quite as well as upon the first; while we shall be in no danger of forming an irreverent habit of questioning the accuracy of those "holy men of old, who spake as they were moved by the Holy Ghost," whether they are declaring to us the Divine perfections, human actions, or the first birth and final destiny of the material creation.

Your faithful servant,

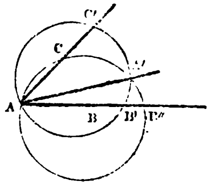
AN OLD SUBSCRIBER IN HOLY ORDERS.

ANSWERS TO THE MATHEMATICAL QUESTIONS.

QUES. 148.—*Proposed by Mr. Collins, A.B., Liverpool.*

A B and A C are two fixed straight lines, in which take two variable points B′ and C′, so that $m \times \mathrm{BB}' \pm n \times \mathrm{CC}' =$ a constant line, m and n being given numbers; it is required to prove that the circle passing through A B′ C′ will pass through another fixed point A′ which may or may not coincide with A.

Answered by Petrarch.



Let $\mathrm{AB} = a$, $\mathrm{AC} = b$, $\mathrm{BB}' = \alpha$, and $\mathrm{CC}' = \beta$, then will $\mathrm{AB}' = a + \alpha$, and $\mathrm{AC}' = b + \beta$. Hence if we take A B and A C for co-ordinate axes, the equation to the circle A B′ C′ will be

$$x^2 + y^2 + 2xy\cos \mathrm{A} - (a + \alpha)x - (b + \beta)y = 0 \quad . \quad . \quad . \quad (1)$$

and the given condition $m \,.\, \mathrm{BB}' \pm n \,.\, \mathrm{CC}' =$ constant (k), becomes

$$m\alpha \pm n\beta = k \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (2)$$

$$\text{or } \pm n\beta = m\left(\frac{k}{m} - \alpha\right).$$

$$\text{Assume } \beta = m\theta, \text{ then } \frac{k}{m} - \alpha = \pm n\theta, \text{ or } \alpha = \frac{k}{m} \mp n\theta;$$

substitute these values of α and β in (1), and we have

$$x^2 + y^2 + 2xy\cos \mathrm{A} - \left(a + \frac{k}{m}\right)x - by + (\pm nx - my)\,\theta = 0.$$

Now whatever be the value of θ, this equation is satisfied by

$$x^2 + y^2 + 2xy\cos \mathrm{A} - \left(a + \frac{k}{m}\right)x - by = 0 \quad . \quad . \quad . \quad . \quad (3)$$

and

$$\pm nx - my = 0 \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (4)$$

The first of these equations denotes a fixed circle, and the latter a fixed straight line both passing through the origin A, and intersecting in general in another point A′. The variable circle will therefore pass through the fixed point A′, which however will coincide with A when the tangent to the circle (3) at A, the equation of which is $\left(a + \frac{k}{m}\right) x + by = 0$, happens to coincide with the straight line (4), and in this case the variable circle will touch a fixed straight line passing through A.

The circle (3) can easily be constructed geometrically by making $\mathrm{BB}'' = \frac{k}{m}$, and describing a circle though the points A B″ C. The straight line (4) must be constructed from its equation in the usual way.

QUES. 152.—*Proposed by Mr. John Smith, Manchester.*

A train, an hour after starting, meets with an accident which detains it an hour, after which it proceeds at $\frac{3}{5}$ of its former rate, and arrives 3 hours behind time; but had the accident happened 50 miles farther on the line, it would have arrived 1⅓ hour sooner. Find the length of the line.

Answered by Pegasus, and similarly by Mr. Smith the proposer, and A. M.

The difference of the time of arrival in the second condition of the question evidently arises from the difference of the rates of the train in passing over the 50 miles; hence if r be the rate per hour at first, we have,

$$\frac{50}{\frac{3}{5}r} - \frac{50}{r} = 1\tfrac{1}{3}$$

which gives $r = 25$.

Let x = length of the line, then the first condition of the question gives

$$2 + \frac{x - 25}{15} = \frac{x}{25} + 3;$$

which, solved, gives x = 100 miles, the length of the line.

QUES. 153.—*Proposed by Mr. John Thompson, London.*

Show when $A + B + C = 180$, that

$$\cot \tfrac{1}{2} A + \cot \tfrac{1}{2} B + \cot \tfrac{1}{2} C = \cot \tfrac{1}{2} A \,.\, \cot \tfrac{1}{2} B \,.\, \cot \tfrac{1}{2} C.$$

Answered by Mr. John Godward, Chelsea, and similarly by Amicus, and Messrs. Smith and Thompson.

$$\cot \tfrac{1}{2} A + \cot \tfrac{1}{2} B + \cot \tfrac{1}{2} C = \frac{\cos \frac{1}{2} A}{\sin \frac{1}{2} A} + \frac{\cos \frac{1}{2} B}{\sin \frac{1}{2} B} + \frac{\cos \frac{1}{2} C}{\sin \frac{1}{2} C}$$

$$= \frac{\cos \frac{1}{2} A \sin \frac{1}{2} B \sin \frac{1}{2} C + \cos \frac{1}{2} B \sin \frac{1}{2} A \sin \frac{1}{2} C + \cos \frac{1}{2} C \sin \frac{1}{2} A \sin \frac{1}{2} B}{\sin \frac{1}{2} A \sin \frac{1}{2} B \sin \frac{1}{2} C}$$

$$= \frac{\sin \frac{1}{2} C \sin \frac{1}{2} (A + B) + \cos \frac{1}{2} C \sin \frac{1}{2} A \sin \frac{1}{2} B}{\sin \frac{1}{2} A \sin \frac{1}{2} B \sin \frac{1}{2} C}$$

$$= \frac{\cos \frac{1}{2} C (\sin \frac{1}{2} C + \sin \frac{1}{2} A \sin \frac{1}{2} B)}{\sin \frac{1}{2} A \sin \frac{1}{2} B \sin \frac{1}{2} C}$$

$$= \frac{\cos \frac{1}{2} C \,[\cos \frac{1}{2} (A + B) + \sin \frac{1}{2} A \sin \frac{1}{2} B]}{\sin \frac{1}{2} A \sin \frac{1}{2} B \sin \frac{1}{2} C}$$

$$= \frac{\cos \frac{1}{2} A \cos \frac{1}{2} B \cos \frac{1}{2} C}{\sin \frac{1}{2} A \sin \frac{1}{2} B \sin \frac{1}{2} C}$$

$$= \cot \tfrac{1}{2} A \cot \tfrac{1}{2} B \cot \tfrac{1}{2} C.$$

QUES. 154.—*From the Senate House Problems for 1842.*

Two ships are sailing uniformly with velocities u, v along lines inclined at an angle θ; show that if a, b be their distances at one time from the point of intersection of the courses, the least distance of the ships is equal to

$$\frac{(a v - b u) \sin \theta}{(u^2 + v^2 - 2 u v \cos \theta)^{\frac{1}{2}}}.$$

Answered by Mr. William Godward, Jun., Chelsea, and on similar principles by Amicus and Pegasus.

Let A B be the given positions of the ships, and A′ B′ their positions at any other time; produce A′ A, B′ B to meet in C, and join A′ B′; then A C = a, B C = b, and $\angle C = \theta$. Let t be the time which the ships take in passing over A A′, B B′, then A′ C $= a + t u$, and B′ C $= b + t v$; therefore, by trigonometry,

$$A' B'^2 = (a + t u)^2 + (b + t v)^2 - 2 (a + t u) (b + t v) \cos \theta \; . \; . \; . \; (1)$$

which by the question is to be a *minimum*. Differentiating this expression with respect to t, and equating the result with *zero*, we find .

$$t = \frac{a\,(v \cos\theta - u) + b\,(u \cos\theta - v)}{u^2 - 2uv\cos\theta + v^2}$$

hence $$a + t\,u = \frac{(av - bu)\,(v - u\cos\theta)}{u^2 - 2uv\cos\theta + v^2}$$

and $$b + t\,v = \frac{(av - bu)\,(v\cos\theta - u)}{u^2 - 2uv\cos\theta + v^2}$$

Substituting these values of $a + t\,u$ and $b + t\,v$ in (1), we find after a little obvious reduction that A′ B′, the least distance of the ships, is equal to

$$\frac{(av - bu)\sin\theta}{(u^2 - 2uv\cos\theta + v^2)^{\frac{1}{2}}}$$

LIST OF MATHEMATICAL ANSWERS.

A. M. ans. 152, 153; Amicus, ans. 152, 153, 154; John Brookes, Manchester, ans. 152; John Godward, Chelsea, ans. 152, 153; William Godward, jun., Chelsea, ans. 153, 154; Pegasus, Greenwich, ans. 152, 154; Petrarch, ans. 148; John Smith, Manchester, ans. 152, 153; and John Thompson, London, ans. 153, 154.

NEW QUESTIONS,

To be answered in our Number for February, 1853.

Ques. 155.—*Proposed by Mr. John Thompson, London.*

Two passengers have together 5 cwt. of luggage, and are charged for the excess above the weight allowed 5*s*. 2*d*. and 9*s*. 10*d*. respectively; had the luggage all belonged to one of them he would have been charged 19*s*. 2*d*.; how much luggage is each passenger allowed without charge.

Ques. 156.—*Proposed by Amicus.*

In any plane triangle A B C, if the angle made by the line drawn from the angle C to the middle point of the side c be denoted by θ, prove that

$$\cot A - \cot B = 2\cos\theta.$$

Ques. 157.—*Proposed by T. T. Wilkinson, F.R.A.S., Burnley.*

To describe a circle which shall pass through a given point P, bisect the circumference of a given circle (C), and have a tangent drawn to it from Q of a given length.

Ques. 158.—*From the Senate House Problems for 1852.*

Show that if x, y, z be the three distances of the centre of gravity of the perimiter of a triangle from each of the sides, and r the radius of the inscribed circle, then

$$4xyz - r^2(x + y + z) - r^3 = 0.$$

⁂ It is particularly requested that all mathematical contributions be forwarded, at latest, by the 20th of each month. All new questions, in order to insure an early insertion, should be accompanied by their solutions.

To Correspondents.

W. T. Y.—We have already, in our Number for December, 1851, (p. 455), given our ideas on this subject, and refer him and our readers generally to that paper. From the results which have followed the attempts to teach etymology systematically in elementary schools, we are not inclined to recommend it as a distinct department; but we believe that it may be taught incidentally with much advantage.

EXTRACTS FROM THE ANT'S BOOK, OR GUIDE TO A RATIONAL EDUCATION OF TEACHERS.

Translated from the German of C. G. Salzmann.

(*Continued from p.* 18.)

FREQUENTLY teachers also become the originators of their pupils' vices by adopting an arbitrary rule to which the young people are to conform, and by setting down every departure from it as a vice in them. If, then, the rule is silly and unnatural, and the young people feel this, they will have no inclination to follow it, will depart from it every moment, and so appear as trespassers in the teacher's eyes. This happens particularly with those proud teachers who consider themselves infallible, who look upon their pupils as slaves who owe them blind obedience, who in all their actions must have regard to their wishes, and on every occasion show the strictest subordination to them. Such a teacher suffers no objection, no contradiction; this would be an offence, a want of respect. When he shows himself, all play is to cease, a profound silence is to ensue, every one is to stand in a reverential attitude before him.

The open-hearted, ingenuous boy, who has not yet learnt dissimulation, and who is disposed to attach himself to every one whom he thinks to be good, will find these requirements insupportable. Fear of ill treatment will perhaps induce him to conform for a few moments to the unjust requirements of his taskmaster; but soon he will forget himself, show himself in his natural shape, and on that account be treated as a good-for-nothing fellow.

Now comes Mr. Crispin, with stiff, meek, and measured paces, strutting along to give his lesson. His scholars are just at the time engaged in playing at ball in front of the house. Some of them are terrified at his look, and bow to him with a hypocritical air; others continue their game. "What shameful behaviour is this!" he shouts to them. "Have I boys out of the streets for scholars?" Unwillingly they follow him into the class-room.

"Sit down!" he commands, "and let no one dare to make the least noise. Write what I dictate to you: *Il vit la carrosse.*"

"Mr. Crispin," says the little lively Nicholas, "I thought it should be *le carrosse.*"

"Quiet!" answers he; "and if it ought to be *le carrosse,* you must nevertheless write *la carrosse,* because I, your instructor, have said so. It does not become a beardless boy to contradict his instructor."

Now he commences explaining the piece dictated, and observes that a few boys are showing one another a little bit of paper, putting their heads together, and laughing. He runs up, takes the paper away, and perceives upon it a small sketch which young Nicholas has just finished, and under which he has written, "*This is Mr. Crispin.*"

Now the lesson is ended, because Mr. Crispin has got into so violent a passion that he cannot continue it. He turns the infamous, abandoned boy out of the room, and commands that he shall not again come before his face.

The remaining portion of the hour intended for instruction, is occupied with sarcasm and threats which I should be ashamed to write. According to Crispin's representation, his class is a heap of shameful, degraded vagabonds.

And what is it that he is so angry about? A production of his own brain—shameful treatment of the teacher—of which another educated man would never have dreamt. If the boys did not allow his presence to interrupt their games, it arose from the consciousness that they were doing nothing wrong; when Nicholas pointed out an error to Mr. Crispin, this was an effect of his amiable frankness, for which another would have shaken hands with him. That in the drawing of his sketch there was not a little malice in the background, I will not trust myself to assert. Granting, however, that this was the case, who called it forth? No other than Mr. Crispin, by the evident wrong which he did the little draughtsman.

Finally, teachers increase the number of vices in their pupils by reckoning their peculiarities as such. If one were to attempt to have the boots of all the pupils in an educational establishment made from the same last, it would be found that they would only do for the smallest number, and for the others they would be either too large or too small. And what would have to be done in this case? Declare the feet which the boots will not fit to be defective? pare off a little from some of the feet of the pupils, to others add something?

You laugh? You want to know what I mean by this strange question? I will tell you at once. Just as every boy has his peculiar shape of foot, so every one has his peculiar character and his peculiar talents. If then you attempt to treat boys, with their different characters and talents, after one foot, or, as we are also accustomed to say, after one last, this mode of treatment will always be suited to the smallest number; and if you count this a vice in the boys, and endeavour to make them suit your mode of treatment, you act with just as little reflection as he who wished to shape the feet according to the boots intended for them. You administer *public* reproof to your pupils for faults which they have committed. This may produce a good effect upon certain callous boys, with whom previous exhortations have been fruitless; but if you do this with all, the ambitious Ferdinand will feel himself offended, and will be disposed to commit the most thoughtless actions; the tender-hearted William, on the contrary, will weep bitter tears, and become discouraged. You are teaching Frederick and Charles. The former understands immediately everything you say to him, and the work you give him is finished in a quarter of an hour. It is not so with Charles. This honest, good boy, has a very thick head, has great difficulty to understand the lessons, spends a whole hour upon the work assigned to him, and, after all, it is not so good as that which Frederick gave in. For this you administer to him reproofs which he has not deserved.

You are giving Henry and Lewis instruction in Latin and mathematics. Henry can positively not understand the rules of the Latin Grammar; in the mathematical lesson, however, he is the best scholar; and Lewis brings you Latin exercises in which you find but little to correct; but mathematics—for this he has no mind. Nevertheless, you require both to make the same progress in Latin and mathematics. You reprove Henry for his laziness in the Latin lesson, and Lewis for his listlessness in the mathematical one,—you do them both injustice. Their laziness and listlessness exist in your brain only.*

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* For twenty years I have been the director of an educational establishment in which children of all sorts of families and nations live together; their number has amounted

This then is my creed, which every one must understand, adopt, and follow, if he is to profit by my Ant's Book.

As, however, all creeds have been abused, so also will it probably be with this one. If many a teacher, with all his endeavours, is able to do little or nothing with his pupils; if they learn but little, retain their former vices, and while under his guidance adopt others; the parents will immediately lay the fault upon him, and will appeal to my Ant's Book. In this they will do wrong.

Did I then say, that *we should seek* for the cause of all the vices and faults of the pupils in the teacher? Nothing less than that. Only of the *teacher* do I require that *he shall seek for the cause of them in himself*, in order that if it does really lie in him, he may remove it. But it does not follow from this that others are to lay them to his charge.

Parents, you also are the teachers of your children; even if you have intrusted their education in some measure to another, yet directly or indirectly you still take part in it. For you also, therefore, my creed is written down. Think over it, reflect upon it, and make the application of it to yourselves. Instead of throwing the blame of your children's defects upon the teacher, seek for the cause of them in *yourselves*. The teacher seeks for it in himself, you seek for it in yourselves, and both parties correct those things in which they have erred. In this way everything will go right.

Whoever does not adopt my creed, but considers himself infallible, and casts the whole blame of his pupils' faults, and the failure of his teaching, upon them or upon outward circumstances, how can such a one expect to teach? He will regard his pupils with dislike, the sight of them will occasion him unpleasant feelings, every instance of thoughtlessness will offend him, he will frequently see malice and wickedness in their most innocent expressions, and believe himself to be surrounded by none but degraded beings with whom nothing can be accomplished. How troublesome will

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for some time past to nearly seventy. Among them I live and act from morning till I go to bed. If, now, children were so bad as they are by many teachers represented to be, how could I endure this? Should I not several times ere this have caught a bilious fever? That, however, does not happen; on the contrary, I enjoy very good health in their society. This is not because they are so perfect, so exemplary; on the contrary, they constantly give me instances of levity, thoughtlessness, and such like. When the lessons are over, they play, run, jump, and shout; I step amongst the exulting company, and my presence makes no alteration whatever. In all this now I see nothing offensive, because I believe that children are children, and that they think and act like children. Therefore whole weeks pass before I am once vexed by them. When this happens, and I examine myself strictly, I generally find that the cause of it still lies in myself, because my body is in a disordered state, or because some unpleasant occurrence has put me out of tune, or because I am too much overloaded with business. The more I watch myself, the more rare do the offences become. Yes, I can declare that in the twenty years I have spent here in educating, I cannot remember that any one of my pupils has deliberately done anything with the intention of annoying *me*. I may be pardoned for this candid confession. I can as little be accused of boasting as the nurseryman, if, in his book on the culture of trees, he occasionally says something of his own nursery-ground. Moreover, I readily acknowledge that from my foster-sons the conclusion cannot be drawn for all boys. For although they are brought together from various houses and countries, still they live in a certain separation from the rest of the world, and the example of adults, the counteracting influence of parents, aunts, servants, and the like, the temptation of boys who have grown up without superintendence and education, have no influence upon them.

Another teacher who is counteracted on all sides has certainly to contend against greater difficulties.

teaching become to him, how harsh will be his tone, how absurd his conduct towards his young friends, and how fruitless all his exertions! He will look forward with longing to the period when he shall be released from the business of teaching, and when he can exchange his present condition for another.

It will come, that earnestly wished-for period! You will then feel yourself lighter, and it will appear to you as if you had been born again. Soon, however, you will find new evils in your new condition; your circumstances will not answer your expectations, and, as you have now accustomed yourself always to seek for the causes of unhappiness out of yourself, you will attribute the blame to your circumstances, and the old complaints will begin again *de novo*. *The beginning of wisdom is self-knowledge;* people in whom this is wanting will not find wisdom in any condition of life, and will everywhere fail to acquire the equanimity and contentedness which spring from it.

Friend, you that devote yourself to teaching, be strong, therefore, and resolve whenever you observe faults and defects in your foster-sons, whenever you do not succeed with their education, always to seek for the cause in yourself. You will certainly find *much* that you did not expect, and when you find it rejoice, and make an earnest endeavour to remove it. You will be sure to succeed, and then—then what a pleasant change you will experience both in and out of yourself! The children intrusted to your care will appear to you in a different light; their mirthfulness will cheer you, their folly and thoughtlessness will no longer offend you, you will treat them with more leniency and forbearance, the harshness and bitterness in your tone, the sternness in your countenance, will vanish, the ebullitions of passion to which you are given will gradually decrease, you will renounce the indolence to which you had accustomed yourself, you will correct many other faults which made a bad impression upon your young friends, you will impart more and more animation and attractiveness to your lessons. When you have thus improved yourself for some time—what will be the result? You will have made yourself a good teacher.

Your foster-sons will reward you with their love and their confidence, they will follow your directions, your efforts will be successful, their faults and vices will gradually yield to your influence.

If, after all, you do not succeed in some cases; if, in spite of all you can do, you cannot get rid of certain faults and vices, you have still the consolation of being able to say with full confidence, *"I have honestly done my part; I cannot blame myself for the failure of my endeavours."*

CONCLUDING EXHORTATION.

The well-known proverb, *Non ex quovis ligno fit Mercurius*, may also be applied to the teacher. In the same way that it is not given to every man to become a painter or a poet, even with the best will and the best guidance, so it is not in every man's power to carry on the business of education with success. For this purpose a peculiar natural aptitude is requisite. A man may be upright and wise in a high degree, may possess great knowledge and varied skill, and nevertheless, if he has not this gift, may be incapable of influencing and guiding children.

Examine yourself well, therefore! If you have followed the hints which have been given you in this book, observe what effect this has upon your little ones; whether they like to be in your company, whether your remonstrances have made any impression upon them, and whether they follow your admonitions. Should this not be the case, do not be angry with them, but examine where you have gone wrong. If, after a prolonged examination, you could perceive in yourself nothing which required to be altered, and if, even with the most sincere endeavours, you could do little with them, and failed to gain their love and confidence; this would surely be a significant indication from Providence, that you had not been destined for teaching, but for some other profession, and you would do well to follow this intimation. After prolonged self-examination, you will certainly find in yourself decided inclination and talent for some other profession. The Father of Men has well endowed each of his children, has given each his talent with which he may trade, which he may increase by a proper application, and which he may employ for the promotion of the welfare of himself and his fellow-men. Follow then the intimation of Providence, and devote yourself to the profession to which you feel yourself called. You will pursue it with pleasure, you will succeed in it, and you will thus do much good.

If, on the contrary, you were to continue to devote yourself to teaching, in spite of all your incapacity for it, you would render life miserable, both to yourself and to those committed to your charge, and, with the best will, you would give their characters an oblique direction.

But if you find that intercourse with children gives you pleasure, that they hang upon you with their whole heart, that you can lead them with facility; then believe that the Ruler of the World has called you to the education of them. Follow His call with joy, and be assured that the reward of faithfulness in your vocation will be very great, that you will always find a cheering influence in the circle of your young charge, that you will see rich fruit from your labours, and by these contribute a very considerable share to the promotion of the welfare of the human family.

MRS. CHISHOLM'S SCHOOL OF INDUSTRY.

The services of Mrs. Chisholm in the difficult and important undertaking of sending out and settling emigrants in a proper manner are now universally acknowledged. The success which has attended her energetic and persevering exertions in this cause has been so great that her name can hardly fail of attaching interest to everything undertaken by her, especially when of a practical nature, and having for its object the welfare of the young, the ignorant, and the unprotected. From a short account of her* "Life and Labours," which has been recently published, it appears that her first public efforts were directed to the establishment of a school of industry for the daughters of European soldiers at Madras, to which place she had gone with her husband, an officer of the Madras army. Her object was to form a girls' school of the children and orphans of the soldiers, in which education should be blended with the duties of housekeeping. And as this is a part of female education which, though very important for all classes, and particularly for the poor, is perhaps less likely than other subjects to obtain notice in a school of industry, it may be of service to those who are desirous of training the young in habits of care and economy, to have their attention directed to the few simple and practical regulations adopted by Mrs. Chisholm for this purpose.

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* "Caroline Chisholm, her Life and Labours." By E. Mackenzie. London: Webb, Millington & Co., 1852.

Her plan, we are told, was to select for the matron of the school an excellent housewife, who was considered more suitable from not being able to read or write, as the responsibility of the reports, consequently, entirely devolved on the pupils. One set of little girls was formed to consider and arrange the duties to be performed. Arithmetic and writing were practically learned by keeping a strict account of the expenses and consumption of every article. The receipts and payments for all food, utensils, clothing, firing, wages, the duties performed, and incidental occurrences, were all minutely recorded. The stores were given in charge to another set, some taking the part of sellers, weighing out and setting down the price per pound, and gross amount of all the items. Thus there was practical shopping and shopkeeping. They consulted on the kind and quantity of food required for each day; the loss caused by boiling, baking, and roasting, all articles being carefully estimated. By this mode of proceeding a girl learned what amount of provisions would be required in a family of three or thirteen; she was taught to give the reasons for such calculations, and to reckon the cost, and hence the income necessary under such circumstances. The children superintended and assisted in every domestic duty, and so learned practical housekeeping.

When sickness afflicted any of them, the causes, symptoms, and cure, were regularly registered, with the view of preparing the pupils for the duties of the sick room. When food was left from the meals, they were to find out whether too much had been cooked, or whether it had not been relished. If an error existed, the trial of a few days corrected it. They also considered how the food remaining could be most satisfactorily used afterwards, or in what manner it could be nicely dressed up to be given to some poor or sick person. Thus they were taught both economy and charity.

It is stated that the children so brought up were afterwards eagerly sought for as servants and as wives; and that some of the younger wives of the soldiers solicited permission to be admitted to partake of the advantages of such instruction. It is added that the institution where this instruction was given, proved the commencement of what is now an extensive orphanage, in which the children who have lost the guardianship of parents are trained up in habits of virtue and industry.

It must not be omitted, that whilst attention was paid to the subject of domestic management, the children were also instructed in reading, writing, arithmetic, and needlework, and that their religious instruction and moral training were particularly regarded. One of the very greatest advantages that we may hope to derive from a school of industry is, indeed, the admirable opportunities which it affords of blending moral and religious training with industrial, and of thus impressing a knowledge of duty upon the youthful mind in a practical form. That Mrs. Chisholm appears to have been fully aware of this, and to have happily availed herself of it, we may infer from the following short list of offences and punishments:—For telling an untruth, or for stealing, however trifling the offence, the punishment was to forfeit five tickets, and to be kept for that day separate from the other children in the school-room, that visitors might at once know the offender. For a second offence, the same punishment, with black bracelets in addition. For breaking crockery, if immediately acknowledged, no punishment; but if discovered afterwards by the mistress or matron, to forfeit three tickets. Parties to the concealment of this offence to forfeit one ticket; for conniving at trifles may in time lead to great crimes. If discovered quarrelling or fighting, to be put on low diet for a day: the same punishment for all concerned. If sulky for six hours, or a day, low diet double the time. Any girl who refused to assist in making a pudding, not to partake of the same. If any part of the dress was torn at play, the girl to be immediately sent into a room to repair it. A black book was kept, in which all offences and punishments were to be entered by the mistress, and the offenders were to be made to affix their names thereto; and this book was to be shown to every visiting member.

The above list of punishments was to be read once a month to the children by the mistress, together with an address, in which they were told that it is much easier to be good than to be bad, and that they must be the one or the other; that it would be a very shocking thing, and would distress their parents, to see their names in the black book; that if they told lies, it was to be feared they would soon learn to steal, for one generally follows the other; and that if they stole sugar and little things, they would in time, probably, steal things of greater value, and that it was dreadful to think what their end might be; that if they were idle they could not be good, and that by being industrious they would be setting a good example to the natives, and that they were to remember that there is no situation in life in which they could not do some good. They were not to forget how kind their parents were to place them in a situation where they were not surrounded by vice and wickedness, and that their parents were now giving up some of their own comforts to add to theirs, and that it would not be enough to love them and to feel grateful, but that they must show their gratitude by their good conduct, and learn to be useful now, that they might hereafter be of real use to them, perhaps in their old age. "Think," it was said, "if your mother should be ill, how happy it would make you to be able to nurse her, and make her nice jellies and light puddings, and do all required for her. You cannot think how dearly a mother loves, and the comfort she would feel in having a daughter for a nurse, and you must learn to do those things before you can have this pleasure, and you have now the opportunity. Think, too, how rejoiced your father would be to see you do all this, and how much such conduct would repay him for having given up part of his allowance to make you a good and dutiful girl. I wish you also to consider how proud your parents will be of you. I fancy I already hear your father say, in honest pride, that my girl can keep accounts, cook a dinner, and she is only fourteen years of age; and your mother says, Yes, and make a shirt, and cut it out as well as, if not better than, I can. That you will be able to do these things I fully expect, and I have no doubt but you will have a great pleasure in doing so; and your being able to do them will give you a proper feeling of pride and independence; that is, if your parents should die, you would be able by your good conduct and management to support yourselves and little brothers and sisters, for God will never forsake the good. . . . Try then, my dear little girls, to be good; never tell lies; never steal the smallest thing; never fight and quarrel; never make use of bad words; and obey and do what you are told, and you will then be the pride of your parents, a credit to your religion, and the admiration of your friends."

In addition to the above address to the children, there was another to the matron and mistress, in which they were urged never to forget that children are early lovers of justice, and that peace and harmony cannot dwell where favouritism reigns; that much would depend upon their own conduct; as children learn more from example than precept, are generally close and faithful imitators of those they reside with, and will judge by their acts and not by their professions; and will, in the twinkling of an eye, discover whether the way to favour is the high road of sincerity or the by-path of hypocrisy and dissimulation; and will either love and respect their instructors, or fear and despise them. "If you rule justly," it was observed, "you will find it easy to govern. Encourage them to be kind to each other, and lovers of peace; reprove them for their faults privately, and if possible without the knowledge of each other; never bring up old faults; be just and impartial in the distribution of tickets, and enter faithfully into the black book all punishments and the cause of them; and if you should have any *particular* complaint against any one of the children, report the same to the managers, that they may direct you how to act. You are not to use the rod, except you have permission of the visiting manager. It will, however, be better that the children should not be aware that it is necessary for you to obtain this permission."

The following specimen of "Extracts from the Assistant Housekeepers' Account Book" is also given:—

"Breakfast ready at half-past seven.

"Weighed the bread and meat; found them correct.

"Gave out of the stores 3 measures of rice, ¼lb. of tea, 1lb. of sugar.

"Extra, 2 spoonfuls of barley to make barley-water for Mary M——, who is not very well.

"There are only 20 measures of rice remaining in store.

"For dinner, boiled mutton, curry, and rice.

"Remarks.—Rice too much boiled.

"At 2 o'clock, made Mary M—— a cup of tea. She is now better.

"As there was some cold meat left, and a small quantity of rice, which would not keep until to-morrow, we made it into a mess and gave it to the poor blind woman.

"The tea-leaves were given to the other poor women as usual.

"The tea-kettle wants repairing.

"Paid the butcher's bill, 13*s.* 6½*d.*

"June 1st, 1836. Mary S——, 13 years,
Jane W——, 12 years,
Kitty M——, 8 years, } Assistant Housekeepers.

"Questions to be answered by Mary S——, Jane W——, and Kitty M——.

"How long was the rice boiling?

"By referring to the accounts, I find there ought to be 5lbs. of sugar in stores; how do you account for the deficiency?

"What have you done with the butcher's receipt?

"What use did you make of the boiled barley after draining off the water?"

It may appear to some that there is little new or worthy of particular notice in the foregoing account, and that this plan for teaching housekeeping is not likely to be of much general use, as it can only be applied where the children are boarded as well as instructed. But, notwithstanding such objections, we conceive that some very valuable suggestions may be gleaned from it. One point of very great moment which it puts prominently forward, is the duty of preparing poor children at the earliest period for the discharge of the active duties of life. The very short time during which they are permitted to remain at school, requires not only that the instruction given should be elementary and thoroughly impressed upon them, but also that it should be imparted in such a manner as to enable them to apply it at once to any employment or service in which they may be placed. And hence the importance of combining industrial training with other kinds of instruction, and of directing the attention of the young to works of industry, and to the proper performance of those domestic duties in the discharge of which the greater part of their lives will be spent, and upon their conduct and management in which their usefulness and happiness so greatly depend. We have already repeatedly expressed our conviction that instruction in works of industry will promote rather than impede progress in other kinds of learning, by in some degree checking the early removal of children from school. For when parents find that by leaving their children longer at school, they become better servants, more fit for work, and quicker in housework, and cooking, and needlework, more handy whilst at home, and surer of better wages when they go to service, they will do their utmost to keep them at school as long as it is good for them to remain.

It may be objected, that, however valuable instruction in works of industry may be, such instruction can only be given in the form of practical training, and that to effect this schools of a much more expensive character must be established, in order to teach such subjects as cooking, housework, and housekeeping with any success. It is undoubtedly true that mere verbal instruction in any one of these subjects would not of itself be of much value. But we are convinced, as we endeavoured to show in a former volume,* that even verbal instruction, properly given at school, would be productive of much good. We were led to the subject by the publication at that time of the Finchley Manuals of Industry on Cooking and Household Work, of the value of which our sentiments remain unchanged. We then pointed out how mere verbal instruction in such matters might be turned to account, and serve as a first step; and that although it could not render a girl capable of cooking or washing, it would turn her attention to such matters, and make her more observant of them when at home, and interest her in them, and so render much of the verbal instruction given her, thoroughly practical. And the same may be said of the description which we have given above of Mrs. Chisholm's mode of teaching housekeeping. By directing the attention of the child to such a subject; by teaching her how to calculate the quantity of food required for a certain number of persons, the cost of each article, and the sum wanted to provide for all, she would be much more likely to use care and forethought about such particulars in after life, and she would, at all events, know how she ought to proceed, and how to make her calculations. And the same may be said of the moral instructions conveyed under the head of offences and punishments. A child knows in a general way that it ought not to steal, nor to utter an untruth; but this falls far short of having such knowledge thoroughly impressed upon the character by constant application, and by being again and again punished or rewarded in a marked manner, according to the conduct in these respects. This, by the way, is a part of practical moral instruction which can hardly be said to hold the high position which it deserves in our ordinary schools, and Mrs. Chisholm's plan of constantly reminding the young of their duty to their parents and to each other, and of the future benefits that would follow their good conduct, is well worthy of attention.

We cannot conclude these remarks without mentioning the recent publication of another of the Finchley Manuals, on the subject of "Plain Needle

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* Journal of Education for 1850, Vol. iv. pp. 240, 314.

Work, in all its Branches." This number of the series may be more easily rendered available generally for the purposes of industrial training than those on cooking and household work, because in this work of industry actual practice may be combined with verbal instruction and explanation, without requiring any outlay for implements or additional school room. Not only the elements of plain needle work are enumerated and explained, but also the methods of cutting out, repairing, and so forth are described. Directions, and rules, and tables, and diagrams for these purposes are given, and questions and answers are framed upon them, to assist the teacher; and these, it is presumed, will be found equally useful to the mistress as to the learner. They can scarcely fail to prove of much assistance to the memory of the former, and so become a means of saving much time and trouble; and to all they will be exceedingly serviceable for reference. In addition to instruction on every branch of plain needle work, some information is given respecting the easiest and simplest sorts of fancy work. It is suggested that permission to receive instruction in these might be occasionally granted as the reward of merit, as the favoured pupils would find not only that the art is easy of acquisition and amusing in execution, but that it may, under some circumstances, be rendered very profitable. If the use of this manual should enable those who have hitherto taught needle work without such assistance, to teach it henceforth more readily and successfully, we trust that they may be thereby induced to have recourse to the earlier manuals, with the view of attempting, by their aid, to give verbal instruction in the other works of industry of which they treat. For, however humble those subjects may be in themselves, the exercise of the youthful mind upon them will draw out and strengthen the powers of observation and memory, and furnish it with a kind of knowledge which will not afterwards be lost, but continually increased. The *how* and the *wherefore* relating to such matters, taught at school, will be carried away and applied to the purposes and business of actual life. The mind already habituated to occupy itself with the works in which the hand is now constantly engaged, will find both pleasure and encouragement in the exercise; and as from time to time some simpler or better method of performance is discovered, the employment itself will become more agreeable and appear more worthy of the attention of a reasonable being, and not a mere piece of drudgery, as acts of labour are too often regarded by those who go to them from school, considerably advanced perhaps in some departments of knowledge, but wholly ignorant of everything connected with the occupation to which the remainder of their lives may be devoted.

LETTERS OF A GERMAN ON ENGLISH EDUCATIÓN.

Translated from the German of Dr. Weiss, Professor of Joachimsthal College at Berlin, by Dr. A. Selfs.

(Continued from p. 7.)

ELEVENTH LETTER.

Subjects taught at English Universities.—Dr. W. Whewell.—Views of the importance of Classical learning.—Mathematics.—Progressive and permanent studies.—Prize Essays.—Specimens taken from Cambridge.—Private Tuition.—Cramming.—Examinations.—Terms.—Punishment.—Divine service in-doors.—Reforms intended, and why?—The Scotch Universities.

THE subjects of instruction at the English universities are the Bible with ecclesiastical history, the classics with metrical composition, logic, and mathematics. This system has of late been explained and precisely judged by Dr. William Whewell, who holds now at Cambridge the place once filled by Richard Bentley, namely, that of Master of Trinity College. His writings and those of Denison Maurice were more interesting to me than any other publications on education which have appeared of late in England; the more reason have I to regret that, though I had received letters of introduction to both gentlemen by your kind assistance, I have yet not been able to make their personal acquaintance, as they had both set out for the continent. Dr. Whewell, celebrated by his mathematical writings, has recommended eloquently the study of his favourite science, and certainly contributed no little to promote it at Cambridge. Yet he is very far from depreciating the classics on that account. "If you take away the classics," says he, "you will destroy more than one chord in the very instrument on which our own classics are playing; we shall no longer understand what is classical in them." According to his opinion the end of studying antiquity is to comprehend the literature and intellectual history of all the ages past, up to the present, as they had antiquity for their basis. Mathematics, on the contrary, serve for introduction into the inquiries of modern age alone. Thus at least their importance is understood at Cambridge. They are not subject to so much change and individuality of opinion as the said sciences of a more historical nature, and their method results of necessity from the object of mathematics themselves. Thoughts like these occur already in Plato's and Aristotle's writings.

I am inclined to think that the preference of systematical profoundness and theoretical perfection is on the side of our schools and universities, for so it appeared to me when I saw the printed propositions and questions that were placed before the students at the examinations. But they enable their pupils excellently to follow and comprehend mathematical or physical demonstrations and to make use of the inductive method. It is their principle that *some* insight into the progressive sciences is an essential part of a liberal education, though the universities as well as the public schools represent the permanent, not the fluctuating elements of human knowledge. Education, such is their opinion, is not obliged to keep pace with the changing ideas of every age; it can only deliver the results acquired by *past* generations to that generation with which it is intrusted. For new truths ever rest upon the old ones, and deference for the ages past must prevent us from leaving hastily the solid foundations laid down by our ancestors. For this reason the progressive sciences ought to rest upon the permanent studies, as they think.

It was no other reason which preserved them during centuries from innovations on the plan of their university instruction; also their method of teaching, and the constant use made of the memory, are derived from this positive principle of English instruction. They wish to develop the intellect by learning by heart, trusting that the dead letter would soon become full of meaning and use to the beginner. It may easily be conceived that this method must often lead to a mechanical way of teaching; and, in fact, the universities are no less liable to this reproach than the public schools are. Many a complaint is heard that they adhere too much to the letter and do not look sufficiently at the spirit and use of the objects which they cultivate. In their reading, for instance, they take too little notice of the real genius of a classical author, and dwell too much on the interpretation of the text. Conscious of this tendency in English instruction, Dr. Whewell has pronounced it not necessary for a liberal education that a young man should write Greek at all, and compose Latin verses; he thinks it far more important that he should become familiar with ancient authors themselves; or else he will acquire a certain skill, as it were, in one hand or in one foot, and yet leave the other parts of the body without practice. The success of collegiate life depends, of course, on the tutor. If he is a man of conscience and intelligence, he will even with the existing method obtain considerable results and really enlarge the knowledge and views of his pupils.

The *prize essays* that are published do not exactly give an average of the industry and accomplishments of the majority. Those that I have seen were actually much in honour of their university. Thus the *Prolusiones Academicæ* of Cambridge (of 1850) contain a very beautiful poem by Julian Fane, son of the Earl of Westmoreland at Berlin, "On the Death of the Queen Dowager Adelaide;" besides a Latin poem, "Mare arcticum," by C. L. Hammond; a Greek ode, by Philip Perring; another Latin poem, "Regina Hiberniam visit," by W. Raynes; some Latin and Greek epigrams, and a scene from the "Merchant of Venice" translated into Greek—all of them proofs of uncommon skill of diction. The solemn commemoration is the annual day when the prize essays are published; at Oxford it takes place in the Sheldonian Theatre.

As some come to college not being sufficiently prepared, and often unable to construe a sentence of Cicero or Xenophon, they are allowed to have recourse to private tuition. The same means are resorted to when they would pass their examination and have not learned enough by their college tutor. This is termed *cramming,* and those crammers or private tutors who are considered most successful in giving the knowledge requisite for examination within the shortest time, get so many applications that the college tuition quite suffers under this abuse; the one must be paid as well as the other, and expenses consequently increase. A system so abused as private tuition can give hardly more than superficial knowledge, and many persons have avowed that they have entirely spoiled the success of their college-years by relying on it, as it taught them only a number of tricks or common-place topics and no sound instruction. A solid college tuition, supported by industry on the part of the student, is in many cases able to lead to a close familiarity with ancient authors, and will best lead him to a thorough comprehension of antiquity.

Prizes and examinations add an outward stimulus to the application of students, and the practice of reading for honours or degrees has been palliated also by Dr. Arnold, because it directed the powers of the student on a fixed object and for a fixed end. It is, however, much calculated to favour a mechanical and desultory mode of studying. Everybody is allowed to try for a metrical prize, under the condition that he is able to translate simple prose writers. As the questions occurring at examinations have become rather settled by custom, they do not always give a true criterion of the real advancement of the students. Formerly it was the custom to hold public disputations, and so to form judgment on those that participated. But considering the great number of persons appearing at once, and many other inconveniences, this mode of examining was left off, and the present method chosen in preference, after a few trials. A great many persons desire a further reform of the examinations as they are now. At Oxford they attach already a particular importance to the oral questions, and continue a longer time with them than with the other part of the examination. A fit method that might combine both oral and written trials has not yet been discovered.

The previous and smaller examination ("Little go," as it is termed) which serve only for repetitions, not for getting a prize or degree, is not carried on with so much strictness. Such examinations are rather intended as occasional stimulants or warnings, and therefore excuses and circumstances are taken into consideration. But if a student does repeatedly fail to satisfy the ordinary demands he will be obliged to spend one or more additional terms at the university, ere he can be admitted to examination for the Bachelor's degree (the Great go). The usual time is ten or eleven terms, of which there are three in the year; they are divided by the Whitsunday, Easter, and Midsummer holidays. A harder punishment than the augmentation of terms, though rather intended for grosser offences, is the *rustication* or *relegatio ad tempus*, and the severest and most dishonourable of all is the *rusticatio sine die.*

He who has properly kept the usual number of terms is no longer bound by the particular restrictions that he must observe before; for he is sure to have attained the necessary firmness and solidity of character which is the end of university life rather than a certain amount of knowledge. English colleges have practically carried out the Platonic problem, whether virtue can be taught or not; they have discovered its solution according to the theory which Socrates proclaims, namely, by proving that it is taught by example, inducement, and communion. The close intercourse with older persons to whom due deference must be paid, accustoms them to self-regulation and self-restraint, and gives them a constant gentleman-like demeanour. As soldiers wear their uniform to remind them always of the duties and obligations of their profession, so the English students all wear the same particular dress.

Another circumstance contributing to their moral education is the daily attendance at divine service. The college authorities are well aware that, as it is obligatory to discharge this duty, real devotion does not always fill the hearts of those that frequent the chapel. But order, custom, and daily habit prevail even on those that do not come by a real impulse, and impart to them their salutary blessing, if it is only by the momentary impression which the holiness of the place or the dignity of divine service leaves on a rambling imagination. Who does not know that churches are visited by many who do not bear God in their hearts? But the outward fulfilment of religious forms, however ineffectual it may be, is considered throughout England as the first and most indispensable condition, which man in general, and especially education, ought to regard.

No sooner do the college lectures of the tutor draw to a conclusion, the first degree having been taken, and scarcely has the student given up *permanent* studies for those that will inform him of the higher and modern results of science, when new examinations engage his labour, and partly want of time, partly general unfitness for a more independent mode of studying, after the training method of the colleges, hinder the majority of students from attending the lectures of the professors. Thus it happens that only a few students of particular gift or zeal frequent these assemblies, which with us form the only resource of the university. In fact, the general ardour with which our students listen to the discourses delivered by our university teachers is altogether unlike the limited application exhibited in the English colleges. It could happen only in Germany that a university would be appealed to as a scientific authority. I have heard former Oxford and Cambridge students complaining that they had been left at college too ignorant of the progressive studies, and particularly of philosophy. People are beginning in England to see that little is done by merely inveighing against German philosophy, and that they cannot thus hide the insufficiency and narrowness of their own scientific views.

Partly considerations of the said defects of the universities, partly some other abuses which the colleges retain with their old privileges, have led to a loud and general desire for a thorough reform of them. It is especially the exclusive character of the colleges which is attacked. Whoever does not belong to a college, is not a member of the university: thus it is not open to the whole nation but only to a privileged class which the colleges choose to admit. Thus the dissenters are still excluded, although great efforts have been made in favour of their admission, among others also by Dr. Arnold and his friends.

Another subject of complaint exists in the circumstance that so many fellowships are in the hands of persons entirely unable to discharge the duties of a university tutor. The persons enjoying these sinecures suffer themselves readily to be ascribed *quietis deorum ordinibus*. Originally most of these privileges were connected with certain conditions, such as reading masses, residence at the place, and others: now as these conditions are no longer regarded, those privileges have the appearance of usurpations.

Sir Robert Peel once said, though not with regard to universities, corporations were unable to avow their own errors; the impulse of a reform ought to be imparted to them by others, as they would never out of their own will, be inclined to an amelioration. Therefore the movement concerning the abuses of the universities and the egotism and *vis inertiæ* of the colleges was brought into Parliament and a royal committee was appointed for enquiry. To oppose its resolutions will be useless, as they are likely to be backed by Parliament. Yet the colleges refused to give to the deputies of the committee the desired information, and contested the right of government to exercise any kind of superintendence over establishments connected with the Church and founded for ecclesiastical purposes. But this objection does not hold good if we consider that the members of the committee are themselves bishops or other dignitaries, with only few exceptions. Others have justly observed that, as the first founders looked upon a state of things and conditions entirely altered in the present age, so that their intentions could not be carried out to the letter, and as the actual use made of their endowments did no longer correspond with the benevolent design they had, the colleges ought to undergo a revision, or at least to make such alterations as would bring them nearest to the intention with which they were established. Supposing a man had left large sums for ransoming Christian slaves from the pirating states of Northern Africa, and had died long before the extermination of this kind of slavery, ought not his endowments to be used for a purpose as similar as possible to the benevolent design he had had? Just so the universities, which no longer perform their original purpose, ought to submit to needful alterations.

They may be as wealthy, they may be as aristocratical as they like; but it is desired that their wealth should be enjoyed by a greater number of persons than at present; besides college instruction, which had until now adhered to traditional custom and had only been remodelled exactly like the college buildings, that, if they wanted repairing, were always restored in the same style of architecture as before, should henceforth, by means of a fundamental revision, receive more elements conducive to general knowledge. Frightened out of their old tranquillity, the two universities have, as far as regards this latter point, entered already upon slight reforms and altered the style of examination, which measure must draw on other alterations in the instruction itself. By following this course they may perhaps obviate external compulsion, and by knowledge of their own defects no longer obstruct in this point the centralising policy which Sir Robert Peel forced upon government, in order to lessen the influence of corporations. In fact, the variety of higher scholastic establishments in England has hitherto been left to a growth as luxurious as the parks and gardens of the country; government wishes now that they should be remodelled with a view to greater uniformity that may render them more useful. Just as this desire is, it cannot be carried out by arbitrary measures, which would have no chance of passing in a country like England.

Last month (July, 1850) I was present at the debate on University Reform, in the House of Commons, where the confidence that the university reform would be brought to a satisfactory end was firmly impressed upon my mind. The apology which Gladstone, member for Oxford, gave for the universities was a proof of his great ability as a speaker, but it did not convince me. He explained in precise terms the satisfactory result of the practical part of university education, as the pursuit of science was but a small part of its business. He said the English universities had answered the exigencies of the country, and at least had done their duty as the school of English statesmen. In the Church of England almost every learned man had been reared in the universities, and an immense proportion of them had come from the humblest classes. It seemed, though, that he chose a rather low standard for the requirements of the universities with respect to knowledge. Among the adversaries of the universities one Mr. Drummond was remarkable for the crudeness of his attacks on Prussia, which he abused without knowing it. He was of opinion that the English universities had indeed become totally incompetent to discharge their duties to the public in a way beneficial to that public. But he would rather that they remained as they were than that they should be remodelled after the pattern of German universities; the introduction of Popery would not be so great an evil as that of German science would be. "There is far greater danger to this country from the introduction of German literature, filling people's minds with that abominable system of neology. If there is a quarter of which we ought to be jealous, it is the north of Germany, and especially Prussia. I very much dislike everything that comes from that quarter," &c. This unprovoked avowal was heard amidst general merriment. With this exception the members speaking on that occasion entered upon the question with as much sense and propriety as accurate knowledge of facts.

I shall not conclude my letter on the British universities until I have added a few remarks more respecting the Scotch universities. Their institutions are far more like our own; they have not adopted the tutor system, but the lecturing, or professor system; therefore they form less secluded corporations, have no exclusive creed, and do not represent a certain religious character, like the English colleges. They are not so expensive, and require no previous examination on entering. The great number of students that frequent them are divided into several classes, and instructed as in schools. A foreigner cannot pronounce a severer judgment on them than the Scots do themselves. Undoubtedly most students enter too early, and without sufficient preparation; some have just left the parish schools, and might rather be considered as boys when they come to college, so that the professors are obliged to begin with the rudimentary subjects, for instance, the elements of Greek grammar. Professor Blackie, of Aberdeen, who has edited an excellent translation of Æschylus, dedicated to our Professor E. Gerhard, wishes that, on entering the university, the only things required were the capability of translating an easy passage of Livy, and something out of the historical parts of the New Testament, and of turning a simple narration from English into Latin, without any gross blunder in the flexion of words or the structure of sentences. Besides, he thinks requisite some acquaintance with the principal objects of Roman and Greek history and of geography, and with the chief rules of Latin prosody. But if any one should be able to translate passages of Xenophon's Anabasis without any gross blunder, he should enter at once into the classes which were entered by others only in the second year. You will own that these demands are uncommonly moderate, and do not bear any comparison to the conditions of our gymnasial departing examination. Every well-taught boy of our Tertia (age from thirteen to fifteen years) knows, according to this account, as much as is required for a Scotch university.

The "North British Review" of 1850 contains another statement concerning the state of Scotch universities. "We grieve to say," such are its words, "our inferiority is almost beyond dispute. The standard of scholarship in the highest philological classes in our university is absolutely inferior to that in the fifth form of any respectable English or German school." The writer, himself the Professor of a university, remarks, at the same time, this state of things is not likely to meet with any amelioration, unless an entrance examination were introduced similar to that of English universities, or else a departing examination, after the model of German gymnasia. As yet there are too few schools that give a proper preparation for the university, and the universities themselves rather deserve the name of schools.

Yet these same Scotch colleges allow to the young men a liberty which might hardly be expected, if we consider their age and learning. The whole time when lectures, or rather instruction, goes on, occupies but little more than five months; all the remainder of the year is holiday-time, during which the young gentlemen are entirely left to themselves and their private inclinations.*

The High School at Edinburgh teaches, in many points, more than the said universities, and approaches the degree of advancement at our gymnasia, particularly since Dr. Schmitz, from Aix-la-Chapelle, the well-known editor of Niebuhr's Letters, has been intrusted with the Directorship. In six years a pupil passes through all the classes, of which the Rector's class takes two years. During the first four years the same master accompanies the pupils through all the intermediate classes as their principal teacher, and begins again with the lowest class, when that space of time has elapsed. Such is also the custom at many of our Catholic gymnasia. It is very convenient, as far as it enables the master to become familiar with his pupils, to know their nature and wants, and to gain their affection; but it is fatal to the pupils when they chance to fall into the hands of a bad master.

Whereas the higher order of scholastic establishments in Scotland is inferior to those of England, and stands generally on a low scale, national education is there better provided for throughout the country than it is in England. The nature of the Scotch parishes accounts for this fact, as, shortly after the Reformation, every church in Scotland was combined with a school. Of course, in the large manufacturing towns, where the population is thicker than in the country, there is the same state of ignorance among poor people which prevails in England. I have been informed that one half of the indigent children grow up without being sent to school. The religious dissensions of the Scotch are only calculated to make the matter worse. I intend to enter into the national education of England in my following letter.

TRANSLATIONS OF THE CLASSICS.

Goethe, in his Wahrheit und Dichtung (Book XI.), which contains many valuable remarks, has the following on translations. We give the substance or meaning, without attempting to give the very words. He says, that on the appearance of Wieland's translation of Shakspere, it was received with the greatest eagerness. Shakspere, translated into prose, first by Wieland and then by Eschenburg, was adapted for all readers, and produced a great effect in Germany. He says, that he honours rhythm and rhyme, by which poetry is really made poetry; but that the real depth of poetry, and its beneficial effect, that which really forms and instructs, is what remains of the poet after he is translated into prose. The pure, perfect substance still remains, while a dazzling exterior, when substance is really wanting, presents us with a fallacious appearance of it, and when the substance is there, often hides it. For this reason he considers a prose version better than a poetical version for the early instruction of youth; for it may be observed that boys, who readily make a jest of everything, amuse themselves with the sound of the words, the fall of the syllables, and with a kind of parodistic wantonness destroy the deep meaning of the noblest work. He thinks then it is a matter for consideration, whether a prose translation of Homer should not be undertaken; but it must, however, be worthy of the high state which German literature has attained. He leaves this for the consideration of the worthy German teachers, whose great experience can best decide this matter. He observes of Luther's translation of the Bible, that this excellent man, by translating all throughout into his mother tongue, a work written in the most different styles, some parts of which are historical, some poetical, some expressed in the tone of command, and some in the form of teaching, did more for religion than if he had chosen to imitate the peculiarities of the original in every particular. In vain have attempts since been made to enable us to relish the book of Job, the Psalms, and other poetical parts in their poetic form. For the mass, whom it should be our object to work upon, a plain translation is always the best. Those critical versions which aspire to rival the original, serve only to amuse the learned.

The author's meaning is plain enough, but it is not easy to express in English all that he says in a language so much more comprehensive and powerful than our own. If a good deal of what is now called poetry were tried by being reduced to the form of prose, it would be very unpalatable stuff. Goethe's test is a true one. A poet is a poet still, even when he is divested of the ornament of rhythm and rhyme. Any one who will try Homer this way will see that his remark is true. I do not know whether there is a prose translation of Homer in German. It would not be an easy thing to do in either language, but it could be done much better in German than in English; for our language, having such a strange medley of words, Teutonic, Latin, and Greek, is ill adapted to express the simplicity of the original. The language of the English version of the Bible is the model which a prose translator of Homer must follow. Some years ago the writer of these remarks made a prose version of Homer's description of Achilles' shield, which those who wish to see may find among the earlier numbers of the Penny Magazine.

We have prose versions of the Greek dramatists, which have been spoken of in a former paper; but they certainly would not have satisfied Goethe, if he had lived to see them. If such translations are to be of any use, they must be done in a different way. The Greek Iambic verse being the nearest thing in that language to the form of prose, it seems that as we have a blank verse, for which our language is well adapted, there is no other form in which these parts of the Greek drama ought to be translated. Our blank verse is also capable of representing Homer with tolerable fidelity, which our rhyme never can do; for the exigencies of the rhyme compel a translator to introduce so much that is not Homer, that the likeness is destroyed, and the reader can form no true judgment of the original. The character of Greek poetry, and particularly of Homer, is different from most modern poetry. It does not give us minute descriptions of objects, and an enumeration of their parts; but it presents to us the objects themselves in their entirety by a single word or two. It puts before us living realities, nature itself in its variety, beauty, and grandeur. Pope's rhyming version of Homer is a caricature. Undoubtedly it has its merits, and it may be, as some have observed, a very fine poem; but it is not Homer.

The prose translations of the Choral Odes in the Greek tragedies seem to be as bad as the other parts; and yet this is a case in which a prose version might be useful, if it were well executed. But it requires a command of our language, combined with a nice perception of the original, which it is not every man's good fortune to possess. There is, however, a mean between a rhyming version and prose. These parts might be rendered rhythmically without rhyme, and the translator might use a considerable license here. We have examples of this style of lyrical composition in some of our own poets.

The Germans have produced versions in German hexameters of the Greek and Latin poets who used hexameters; and they have succeeded better in this than we can. Voss's translations are examples of this; and none of them is more wonderful than his translation of Theocritus. But even German hexameters are not very successful, for the syllables in most words of this language are neither long nor short in the same way that syllables seem to be in Greek and Latin; and a man must sometimes try twice before he can read one of these German hexameters as the author intended it to be read.

Prose versions of the Greek and Latin poets are daily made, for boys render these poets orally into prose, when they translate their lessons to a master; and there is no other way of doing it. The poetical form is thus of necessity destroyed; but the substance ought still to remain. Now, any prose version of these poets, either oral or printed, will not satisfy unless we can hear it or read it with some pleasure; unless we still see the poet in his nakedness. A good teacher will not be satisfied with a loose or even a literal version, especially from those who have made good progress in a knowledge of the language; but he will expect a version which, while it neither adds to nor takes from the meaning of the author, shall be expressed in plain, simple, and forcible English; which shall reject many of the fine words of Latin origin that have damaged our language, and shall always employ good English words when they can be found. Boys may be taught to aim at truth and simplicity in their oral and written versions; and all who have any taste will relish this better than the verbose grandiloquence and the unmeaning platitudes which characterize our modern literature. For the purpose of cherishing a true simple taste, the practice that has been already mentioned, of a teacher reading over the lesson into English after the boys have gone through it, will be very useful; that is, if it is done the right way.

One of our correspondents has already complained of the bad effects of boys getting their lessons with the help of translations; and the complaint is to some degree just. He seems to disapprove of the use of translations, even if the version is good; and it must be admitted that most boys would use even a good translation improperly. It would merely be a way of saving trouble; the lesson would be learned imperfectly, and the boy would make no progress. Goethe, who probably knew little of what boys do in schools, would perhaps have heard this objection from the German teachers, if he had asked their opinion. Boys cannot look on an ancient poet in the same way as a man of mature years and ripened taste; much less as Goethe would. Still Goethe's notion is right, and to some extent practicable. He would have the boy know and feel what the poet says, truly and completely; and a prose version can do this, if it is a perfect version, though the prose version does not present it to him in the form in which the poet has clothed it. But if the translation is really bad; if it is prose, but not the poet—what then? Can we imagine anything more likely to corrupt the taste, to destroy all perception of truth and beauty? This prose version of a poet is a very difficult thing, more difficult than a so-called poetical version. As it is true that the external form of poetry may hide the thought and the substance, or give a fallacious appearance of thought and substance, where there are none; so a metrical version may hide defects, or the difficulties of the attempt may seem to us an excuse for them, while a prose version presents its defects in their nakedness, and critics do not make the due allowance for them.

G. L.

Notices of Books.

THE CALLING AND RESPONSIBILITIES OF A GOVERNESS. BY AMICA. (London: *Longman & Co.*)

"At a time," says the authoress, "when the public mind seems to be awakened to the importance of education, and more especially the education of women, and while much has been said *pro* and *con.* the governess—her abilities both underrated and overrated; her position, on the one hand, degraded to abjectness, on the other, elevated to ideal heroism—it may not be out of place to attempt to explain her true calling and her duties in simple soberness, as far as soberness can be connected with a theme so all-inspiring as the progressive advancement of our common species to attainment and elevation worthy of our divine origin and our immortal destiny."

And well has Amica accomplished her friendly task. The calling of the governess is placed in its true and proper light; and her responsibilities are shown to be among the highest and most sacred. The qualifications necessary for worthily fulfilling these responsibilities are fully detailed. The bare description of them will be sufficient to deter any person who reads this book from entering *unworthily* upon so important an office. The difficulties which the governess is likely to encounter are then considered, including those of the outset—of studying and forming character, and of communicating knowledge, and the "thorns by the way" pointed out; namely, the trials which she will have to endure from the parents and from the children. Next, the errors to be avoided, the duties to be fulfilled, and the encouragement in the faithful discharge of duty, are brought before her, with an exhortation to renewed and increased effort for self-culture. The work concludes with some remarks on manners, dress, and economy. A "list of works it will be desirable to read or use" is appended, which contains the names of the most suitable books in the various subjects, with critical notices of many of them.

This work is evidently the production of a highly accomplished lady. It bears marks of very extensive reading, of careful and discriminating observation, and of considerable originality of thought. It is, we regret to add, another of those pious contributions to our literature in which the bereaved spirit seeks a new channel for feelings of affection, sympathy, and kindness which have received a sudden check. We strongly commend it to the notice of those to whom it is dedicated—"the young governesses of Great Britain—those who are just entering on, and those who are preparing for, labour in the world of mind." Even experienced and successful governesses will, we are sure, find the volume fully repay the purchase and perusal.

GERMAN CONVERSATION BOOK. BY ADOLPHUS BERNAYS, PH. DOC. PROFESSOR OF THE GERMAN LANGUAGE AND LITERATURE IN KING'S COLLEGE, LONDON, ETC. (London: *John W. Parker & Son.*)

This book, as the title further defines it, is a selection from German Prose Dramatists, with a free Translation and Notes. We fear that few students of German will be disposed to read through (to say nothing of studying) detached conversations of this kind, selected from a variety of dramas, while they can derive as much instruction and infinitely more amusement from the perusal of any one of these or other dramas entire.

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1. THE UNION MAGAZINE FOR SUNDAY SCHOOL TEACHERS. VOL. IX. 1852.
2. THE BIBLE CLASS MAGAZINE. VOL. V. 1852.
3. NOTES ON THE SCRIPTURE LESSONS FOR 1852.
4. THE SUNDAY SCHOOL TEACHERS' CLASS REGISTER AND DIARY FOR 1853.
5. THE SUNDAY SCHOOL TEACHERS' CLASS REGISTER FOR 1853.
6. THE CHILD'S OWN MAGAZINE. 1852.

(London: *Sunday School Union.*)

THESE are all either new volumes or new editions of useful publications of the Sunday School Union, with the exception of the last-named, which has only been commenced during the past year. We gave some account of the general character of each of them, except this one, last January, in connection with the volumes and editions issued at the end of the year then just past. We have only now to state that "The Child's Own Magazine," while it is a novelty in periodical literature, appears to us likely to be very interesting and instructive to its little subscribers.

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1. CHRESTOMATHIE FRANÇAISE; OU, CHOIX DE MORCEAUX TIRES DES MEILLEURS ECRIVAINS FRANÇAIS. PAR A. VINET, PROFESSEUR A L'ACADEMIE DE LAUSANNE. A L'USAGE DES ECOLES. PAR LOUIS F. CHAUMONT, MAITRE DE LANGUE FRANÇAISE. (Edinburgh: *chez Robert Seton.*)
2. READINGS IN ITALIAN PROSE LITERATURE. WITH BIOGRAPHICAL SKETCHES. BY G. AUBREY BEZZI, PROFESSOR OF ITALIAN IN QUEEN'S COLLEGE, LONDON. (London: *John W. Parker & Son.*)

THESE two compilations are, in our opinion, the best of the kind that have appeared in this country.

The *Chrestomathie Française* is an abridgment of a work which is in very extensive use in Switzerland, and on the Continent generally. It is highly esteemed on account of the excellence of the pieces selected, of their arrangement, and of the analyses, notes, and biographical notices by which they are accompanied. M. Vinet, who is a clergyman of the Swiss Protestant Church, is well known in his native country by his various religious and literary writings, which are much read and admired. These have established his reputation as an author; but this *Chrestomathie* has gained him a far wider reputation as an educator, or schoolman, as the Germans call it. We think it matter of regret that the work was not published for the use of English pupils in its original form, especially as a book of this kind is chiefly required in schools or families where a trifling difference in price is no great object. The work itself presented peculiar facilities for this, as it is divided into three volumes, progressively arranged, the first being for children (from ten to fourteen years of age), the second for youth, and the third for adults.

The *Readings in Italian Prose Literature* is almost the only Italian prose reading-book that has been published in England, and we are glad to say that it is a really good one. After considerable experience in these matters, we are enabled to say that it is decidedly superior to any similar collection which the Italians have for their own use. Most of these are principally taken up with frivolous stories and anecdotes, which amuse but do not instruct. The pieces selected in the present volume are characterized by utility in the subject rather than by excellence of style. Indeed, the only fault which could be found with it is, that the extracts are *too instructive*, that is, they are chosen too much with the view of instructing and not sufficiently with that of amusing. The first portion consists of short miscellaneous pieces, intended to show the application of the rules of the grammar, and to give an insight into the general structure of the language. A few explanatory notes have been added to the text. The character and arrangement of the latter portion are intended to lead to a critical acquaintance with Italian literature, by a systematic disposition of its various writers. In this arrangement, the order of chronology has very properly been inverted, upon the principle of "ascending from that which is easiest of comprehension to that which is more obscure," a principle which the compiler thinks might be usefully adopted in all literary history, if not in all history. The same plan has been recommended by some one of our school inspectors for teaching English history in our elementary schools; and it is upon a principle analogous to this that Sir Bulwer Lytton, in his "Poems of Schiller," has placed the poet's latest pieces first and his earliest last. The principle involved in both cases is that of gradually retracing the stream of time, instead of suddenly transporting ourselves to some remote point up the stream, and thence tracing it downwards.

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1. REDDENDA; OR, PASSAGES WITH PARALLEL HINTS FOR TRANSLATION INTO LATIN PROSE AND VERSE. BY FRED. E. GRETTON, B.D. (London: *George Bell.*)
2. MATERIALS FOR LATIN PROSE COMPOSITION. BY THE REV. PERCIVAL FROST, M.A. (London: *George Bell.*)
3. THE MASTER'S LATIN VERSE BOOK; A SELECTION OF FABLES IN LATIN PROSE, WITH A VERSION IN LATIN ELEGIAC VERSE, ETC. (London: *George Bell.*)

ALL these books are intended to assist the scholar in acquiring skill in that which is usually and justly considered a fair criterion of classical attainments. Some, in these days, affect to despise composition of every sort, and especially versification; arguing, that a man may be a very fair scholar without knowing much of these matters; that Latin and Greek verse especially is a mere knack; and pointing out some confessedly of great attainments, who were without skill in versification. For our part we consider a fair amount of skill in *prose* composition as absolutely essential, when we have to judge of mere attainments; it is almost impossible to know whether a given person understands the language philosophically and accurately until we see his attempts at composition in the language. It is possible to construe decently—and we find this done repeatedly—it is possible to construe decently and yet be unable to write half a dozen lines without some dozen mistakes; a fact which shows the person in question to have no real knowledge of the language in question. Skill then in composition insures accurate acquaintance with the structure of a language, and is a proper criterion of attainment therein. With respect to verse, it is not so absolutely essential; still it is desirable when it can be commenced early. It adds elegance to scholarship; and though a man may be, as observed above, an elegant scholar without Latin verse, yet we do not *generally* find such to be the case.

Mr. Gretton's book consists of Passages for Translation into Latin Prose and Verse, in all metres. As mere selections, however, he observes, are scarcely all that is practically required in schools, and as they levy too severe a tax upon the master's time, to each exercise there is added a version all but literally rendered back from the author's own translation of the original. A few short notes are added to assist in the rendering of certain words of any unusual difficulty. The passages are well chosen, but we rather doubt whether the addition, in every case, of a version to be literally rendered into Latin, is not likely somewhat to cramp the learner, and repress his inventive faculties. However, the book will be highly useful, if, as perhaps the author intends, the pieces be given out orally, and the version only employed to save the master time. We need hardly add that the versions generally display great skill in composition and sound scholarship.

The second of the books whose titles are given above is restricted to exercises in Latin prose. The passages are selected from well-known English writers, Cambridge examination papers, and so on. And hints are added for the rendering of the more difficult expressions. In addition to this, Mr. Frost, no doubt justly considering it not enough to correct the positive errors in the boy's own exercise, but to present him with a copy of the whole passage, properly and elegantly rendered throughout, in order to improve the learner's general style, has published a key to the work, for the convenience of tutors and masters, whose time is often too much occupied to allow of their translating the entire exercise themselves. This will materially increase the value of the book in schools, as no other book of the kind, with a key, as far as we know, exists. There is also added a preface, pointing out the mistakes into which boys are likely to fall.

The "Master's Latin Verse Book" is intended as a help towards original composition, "to bridge over the gulf between Bland and Gray's Elegy." The plan to be adopted is this: a Latin prose version of a short fable of Æsop is to be given the boy: he will thus have some materials for his verse, and will set to work readily. In case this should not be sufficient, an English version is added, which can be literally rendered into verse. Then, when the boy has completed his copy, a correct version is added for him to look over and compare with his own. He will thus gradually be taught the art of poetical turnings and phraseology, and so by degrees "*sine cortice nabit.*"

A COMPLETE GREEK AND ENGLISH LEXICON, FOR THE POEMS OF HOMER AND THE HOMERIDÆ; BY G. CRUSIUS. TRANSLATED FROM THE GERMAN BY HENRY SMITH; REVISED AND EDITED BY T. K. ARNOLD, M.A.

Of the numerous books which Mr. Arnold, in his anxiety that we should possess "quicquid habent armamentaria Germaniæ," has produced on this side the water in an English dress, we cannot mention one as surpassing or even equalling this in substantial excellence and probable utility. The object of it we shall leave Crusius himself to explain in his preface. "A lexicon of a particular author," such as Homer, "although designed only for schools, should not contain simply an alphabetic series of words, with their definitions, but should notice peculiarities of expression, and passages which are difficult to be understood: it should also embrace the requisite explanations from mythology, antiquities, &c., and thus form a repertory of everything useful for understanding the author. To what extent I have attempted to attain this object will be seen by noticing the contents of this Lexicon. First, then, it contains all the words found in the Iliad and Odyssey, in the hymns and other small poems. Secondly, especial attention is paid to the explanation of difficult passages, and, as far as space permitted, differing views, when existing, have been noticed. Thirdly, it contains all the proper names, accompanied by the necessary mythological and geographical explanations." This is the plan as sketched out by the author, and we are bound to say that, in our judgment, it has been most successfully carried out. As far as we have tested it, no word occurring in Homer is omitted, and the explanations and remarks affixed to each are most admirable. For instance, under the word *δαιμων*, this is described to be, first, "any divine being believed to be efficient in the production of events above ordinary human capability and power, and which yet could be ascribed to no particular divinity;" then the peculiar workings of this divine power in their different manifestations are instanced, as guiding the fate of men, Od. 16, 64; as sending them happiness and being their tutelary spirit, Od. 21, 201; as also allotting misfortunes and sending sickness, Od. 5, 396; as also used for fate, misfortune, Iliad, 8, 166; *προς δαιμονα* against destiny; second deity, god, goddess, spoken of definitely-named divine persons, Il. 3, 420, &c. We can hardly conceive a fuller explanation of this word. Again, taking another instance, *βασιλεύς*. Under this head we find a full account of the peculiar duties and privileges of a king in the heroic ages; that he assembled the public council and led in debate; that it was his place to present the solemn sacrifices, and so on, quoting the several passages which confirm the several particulars mentioned with reference to difficult passages. We take Il. 1, line 566, and find a faithful account of the two methods of interpreting *ὀυ χραισμωσιν. ἆσσον, ᾽ιονθ*, with the authorities for both renderings. The work thus supplies most fully the double place of lexicon and commentary. There is constant reference to Buttman's valuable lexilogus, and the epic and poetic forms of the cases of nouns and adjectives, and the main tenses of the verbs are added. It would have been perhaps a valuable addition if all the passages where any word occurs were cited by reference, as in Linwood's Lexicon to Æschylus, though possibly this would have rendered the work too bulky, and so have impaired its usefulness in schools. Indeed, as it is, the type is somewhat inconveniently small. We again heartily recommend this book as a most valuable help, an almost indispensable help, —we had almost said,—to the student of Homer.

ANSWERS TO THE MATHEMATICAL QUESTIONS.

QUES. 155.—*Proposed by Mr. John Thompson, London.*

Two passengers have together 5 cwt. of luggage, and are charged for the excess above the weight allowed 5*s*. 2*d*. and 9*s*. 10*d*. respectively; had the luggage all belonged to one of them he would have been charged 19*s*. 2*d*.; how much luggage is each passenger allowed without charge?

Answered by Mr. John Godward, Chelsea, and similarly by Messrs. Dyer and Smith.

Let x = weight *in cwts.* allowed, and y = the price *in pence* per cwt. for excess; then, by the question,

$$y\,(5 - 2x) = (5s.\ 2d. + 9s.\ 10d.) \times 12,$$
$$\text{and } y\,(5 - x) = 19s.\ 2d. \times 12;$$
$$\text{or } 5y - 2\,xy = 180 \;\ldots\ldots\; (1)$$
$$\text{and } 5y - xy = 230 \;\ldots\ldots\; (2)$$

Subtracting (1) from (2), $xy = 50$,

$$\text{and} \therefore \text{from (2) } 5y = 230 + 50 = 280, \text{ or } y = 56,$$

$$\text{and } x = \frac{xy}{y} = \frac{50}{56} = \frac{25}{28}\text{ cwt.} = 100\text{lbs.}$$

QUES. 156.—*Proposed by Amicus.*

In any plane triangle, A B C, if the angle made by the line drawn from the angle C to the middle point of the side c be denoted by θ, prove that

$$\cot A - \cot B = 2 \cot \theta.$$

Answered by Messrs. Levy, Godward, and Thompson.

Let E be the middle point of the side AB; join CE, and draw CD perpendicular to AB; then

$$\cot A = \frac{\text{AD}}{\text{CD}}, \text{ and } \cot B = \frac{\text{BD}}{\text{CD}};$$

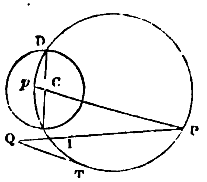
$$\therefore \cot A - \cot B = \frac{\text{AD} - \text{BD}}{\text{CD}} = \frac{2\text{ ED}}{\text{CD}} = 2 \cot \theta.$$

QUES. 157.—*Proposed by T. T. Wilkinson, F.R.A.S., Burnley.*

To describe a circle which shall pass through a given point, P, bisect the circumference of a given circle (C), and have a tangent drawn to it from a given point, Q, of a given length.

Answered by the Proposer.

Construction.—Join PC and PQ; take PC. Cp = CD^2; and PQ. QI = QT^2; then a circle through the points P, p, I, will be the one required.



Demonstration.—Since PC. Cp = CD^2, the point p is in the circumference of the *bisectant circle*, by Prop. 1, Diary 1853, p. 80. Also since PQ. QI = QT^2, the point I is also in the circumference of the *same circle*; hence the circle through the points P p, I, is that required.

Mr. Levy favoured us with a good Solution.

QUES. 158.—*From the Senate House Problems for* 1852.

Show that if x, y, z be the three distances of the centre of gravity of the perimeter of a triangle from each of the sides, and r the radius of the inscribed circle; then

$$4\,x\,y\,z - r^2\,(x + y + z) - r^3 = 0.$$

Answered by Amicus and Mr. S. H. Levy.

Let x, y, z, be the three distances of the centre of gravity of the perimeter of the triangle from BC, CA, AB respectively, and D, E, F the middle points or centres of gravity of the said sides; draw EH, FK perpendicular to AB; then EH = FK = $\frac{1}{2}c$ sin B; therefore by mechanics (Earnshaw's Statics, art. 135; or Tate's Exercises in Mechanics, p. 69)—

$$x = \frac{\frac{1}{2}c \sin B \times (b + c)}{a + b + c} = \frac{ac \sin B \times (b + c)}{2\,a\,(a + b + c)} = \frac{r\,(b + c)}{2a}.$$

$$\text{Similarly } y = \frac{r(c+a)}{2b}, \text{ and } z = \frac{r(a+b)}{2c};$$

$$\text{from which we find that } 4\,xyz - r^2\,(x+y+z) = r^8,$$
$$\text{and } \therefore 4\,xyz - r^2\,(x+y+z) - r^3 = 0.$$

LIST OF MATHEMATICAL ANSWERS.

Amicus, ans. 155, 156, 157, 158; Samuel Dyer, Wanstead, ans. 155; John Godward, Chelsea, ans. 155, 156; W. H. Levy, Shalbourne, ans. 155, 156, 157, 158; John Smith, Manchester, ans. 155, 156, 158; John Thompson, London, ans. 155, 156; and T. T. Wilkinson, Burnley, ans. 157.

NEW QUESTIONS,

To be answered in our Number for March, 1853.

Ques. 159.—*Proposed by Amicus.*

$$\left.\begin{array}{r} \text{Given } x - y = 2 \\ \text{and } (x^2+y^2)(x^3-y^3) = 260 \end{array}\right\} \text{ to find } x \text{ and } y.$$

Ques. 160.—*Proposed by Mr. John Thompson, London.*

Prove the truth of the formula—

$$\cos^3\theta\,\frac{\sin 3\theta}{3} + \sin^3\theta\,\frac{\cos 3\theta}{3} = \frac{\sin 4\theta}{4}.$$

Ques. 161.—*Proposed by Mr. Thomas Ambler, Wakefield.*

In a given paraboloid of revolution it is required to inscribe the greatest cylinder.

Ques. 162.—*Proposed by Mr. W. H. Levy, Shalbourne.*

Let the sides of any triangle ABC, be bisected in the points D, E, F; then the centre of the circle inscribed in the triangle DEF is the centre of gravity of the perimeter of the triangle ABC.

⁂ It is particularly requested that all mathematical contributions be forwarded, at latest, by the 20th of each month. All new questions, in order to insure an early insertion, should be accompanied by their solutions.

SUGGESTIONS ON THE CULTIVATION, MANAGEMENT, AND PRESERVATION OF THE VOICE.

(*Continued from p.* 487.)

[The following remarks, addressed to Clergymen, have been published in *The English Churchman*. We extract them as being useful and suggestive to Masters.]

Our business now is to show the means of obtaining a sufficient and uniform volume of air—that first and most essential requisite for public reading.

We must first understand something of the mechanism for increasing the cavity of the chest by voluntary effort. The ribs do not proceed from the spine horizontally; they have a considerable slope downwards; when raised to a more horizontal position the cavity is of course enlarged. Certain muscles are provided thus to raise them. The muscles termed "intercostal," as lying between the ribs, are the chief muscles of the involuntary system which are applied to this purpose for ordinary respiration. There are also muscles of the voluntary system, about the shoulders and upper part of the chest, which can be applied to increasing this action.

There is another provision for enlarging the cavity of the chest. A membrane called the "diaphragm," somewhat like the parchment on a drum, separates this cavity from the cavity of the abdomen. This membrane is not flat, but convex towards the lungs. By contracting, it becomes horizontal, and the upper cavity is enlarged. It is furnished with involuntary muscles, which are always in action, aiding ordinary respiration. It has also voluntary muscles, by which the action can be increased.

Here are two different sets of muscles, which can be applied at will for increased action in public reading. Let the reader first draw in a full respiration into the upper part of the chest, not suffering the abdomen to protrude, and he will have used the voluntary muscles of the chest. Let him next draw in a full breath into his stomach and abdomen, and he will have used the voluntary muscles of the diaphragm. This last direction is nonsense in a scientific point of view, but it sufficiently directs the effort.

The question now is, which set of muscles are most proper for producing and sustaining a sufficient supply of air? And here we must observe, that sustaining it is as important as producing it. If the cavity be contracted too rapidly, the supply will fail before the sentence is finished, and the reading will necessarily be bad. Let the reader observe the next broken-winded horse he meets. It is evident that, from failure of other parts of the structure, the animal is reduced to breathing chiefly by the diaphragm: he obtains a supply of air, but the flanks rapidly collapse, and the air is immediately expelled. The reader who breathes in the same way will break down; he cannot sustain the supply. The muscles of the chest are those on which the reader must rely. When the abdomen protrudes and retires no more in reading than in ordinary respiration, the reader will have accomplished this part of his task. But the muscles of the chest require careful training. Those muscles may increase the cavity by an effort, but training alone will enable them to sustain it. For this purpose, fair play must be given to them. These muscles also perform other tasks, such as sustaining and raising the shoulders. They must be as far as possible disengaged from such tasks when required for increased exertion of the chest. Nature herself teaches this: a horse suffering from inflammation of the lungs will not lie down; because, while standing, more muscles are available for the chest. A man in asthma leans his elbows on a table for the same reason. The reader must stand erect, with the shoulders back and depressed, if he would read at ease in a large building.

It should be the reader's object to keep the upper part of the chest as uniformly full as possible. If it be full at the commencement, and nearly exhausted at the end of the sentence, the reader will begin with one voice, and end with another. Here we see the reason why so many readers drop their tones to a lower note at the end of every sentence, while few or none ever finish in a higher tone. In this case there is an alteration in the length of the vibrating chord in the larynx; but, from the sympathy between the organs, this is inevitable and uncontrollable under the circumstances of the chest; a sustained volume of air is the only remedy.

In a well-practised reader, the chest swells when he commences to read, and continues so with slight variation; it never returns, while he is reading, to its ordinary size, much less sinks below it at the end of sentences, which commonly happens with a bad reader. By avoiding waste, of which we shall speak again, the expenditure is by no means so great as in the bad reader; and the reservoir being always nearly full, the stream is evenly sustained. By this alone can a uniform tone be preserved in reading; and careful practice and training of the muscles, and such training alone, will enable the reader to accomplish this.

The reader should also have a clear idea of the use to be made of this sustained supply of air. Here his object must be to acquire the power of reading every sentence in one note of the musical scale, sustained to the end without sinking to a lower one. This is in fact the great object to be attained.

We are no enemies to the proper modulations of the voice—that is, to the use of various notes in the musical scale. This is perhaps the noblest ornament of the human voice, and the most effectual instrument of expressing our own feelings, and exciting corresponding feelings in others. It is the simplest and truest form of natural expression. But being a power of expression given by nature herself, it belongs to what is natural, not to what is artificial; and, by marking this, we may learn its use. The feelings of the heart are natural, and uniform; words are artificial signs, for they vary in different nations. Variety of tones are to express the feelings, not to mark the signs. Hence modulation is to distinguish sentences, not words. Two sentences expressing opposite feelings should be contrasted in their tone; a high tone expresses excitement and joy—a low note, sorrow and depression; this is nature's expression of her feelings, and it is noble and forcible. But if we degrade this noble form of expression, to mark the words or signs, as they happen to stand first, or midst, or last, in a sentence, what have we expressed? The sentence may be inverted, and the words transposed, and the ordinary reader no longer gives the same tones to the same words, but to the same places in the sentence. His tones have nothing to do with meaning; they are therefore unnatural, and outrage common sense and human nature. And, when constantly applied with unvarying sameness in endless repetition, they fatigue the ear, and compel the outraged mind to turn its thoughts away.

This is perhaps the worst and most general fault of our public readers, and we have therefore been careful to point out its cause and remedy. The reader must acquire the power of a sustained and even tone; not that he may never modulate his voice, but that he may have power to modulate it in conformity with the feelings of nature, and not merely mechanically.

If anything were necessary to convince us that it is unnatural to apply modulations of tone to bare signs, we might learn it from the brogue of the Irish, and still more from the accent of the Scotch. These consist simply in giving varied notes or modulations to the several syllables of words. The speaker is generally unconscious of it, for a reason we will try to explain again. Every district hates and ridicules the accent of all others, thus uniting their testimony that all are unnatural, and a perversion of the powers of nature. Is it any better to apply the power to mark the place of the signs, than to mark the component parts of the signs? Yet this is what our public readers do. We never hear this in ordinary conversation; hence we conclude that while the brogue or accent is mere habit, arising from imitation only, the alterations of tone in public reading have a natural cause connected with the action of reading, which it has been our object to point out.

When the reader finds his chest swell, and continue so with slight variations while he reads, he may hope that he has found the remedy, and that he has acquired, by practice and training, the first requisite for a public reader. We shall proceed in our next Number to the other means by which he may form a right judgment of his success.

GENERAL EXAMINATION OF TRAINING SCHOOLS.

CHRISTMAS, 1852.

SCRIPTURAL KNOWLEDGE.

DIVISION I.

SECTION I.—1. State, shortly, what is recorded in Scripture of Abraham.

2. What where the principal events in the life of Joshua?

3. Give some account of the captivity of the Jews in Babylon and of their return.

SECTION II.—By what considerations did our Lord in his Sermon on the Mount enforce—

1. The love of our neighbour.
2. A reliance upon God and heavenly-mindedness.
3. The emptiness of a profession of the gospel without obedience to its precepts?

SECTION III.—1. Relate, carefully, the events in our Lord's life, which immediately followed his Sermon on the Mount, as recorded by St. Matthew.

2. Matthew xvi. 13, "Whom do men say that I am?" Relate the conversation which followed this inquiry.

3. Matthew xviii. 1, "At the same time came the disciples to Jesus, saying, Who is greatest in the Kingdom of Heaven?" continue the narrative. The subject is returned to in the next chapter; state under what circumstances.

SECTION IV.—1. What is recorded in the Acts of the Apostles of St. Barnabas?

2. State fully the particulars of the examination of St. Peter and St. John before the Sanhedrim, after the healing of the lame man at the gate of the temple.

3. Describe the planting of the church at Antioch in Pisidia, at Philippi in Macedonia, and at Corinth.

DIVISION II.

1. What principal events are recorded in the book of Jeremiah?

2. Among the reasons for believing the Gospel of St. Matthew to have been addressed specially to the Hebrew Christians, is this—that he makes frequent reference to prophecy in proof that Jesus was the Messiah. Give examples of such reference.

3. What forms of idolatry prevailed chiefly among the Jews; whence were they introduced, and how, and by what means were they supported?

4. Give some account of the history of the Jewish nation between the time when the Old Testament narrative ends, and that when the New begins.

5. Give some account of the writings of St. John, and of what is known from Scripture and tradition of his life and labours.

6. Give some account of the Epistle General of St. James.

7. Give a short analysis of the Epistle to the Galatians.

8. Explain the following passages:—

> "But ye say, Whosoever shall say to his father or his mother, It is a gift, by whatsoever thou mightest be profited by me; and honour not his father or mother, he shall be free. Thus have ye made the commandment of God of none effect by your tradition." Matt. xv. 5, 6.
>
> "And when they were come to Capernaum, they that received tribute money came to Peter, and said, Doth not your master pay tribute?" Matt. xvii. 24.

9. Explain the words printed in italics in the following passages, and state anything worthy of observation in connexion with them.

> "When they were past the first and second *ward* they came to the iron gate which leadeth to the city." Acts xii. 10.
>
> "Now when they had gone through Phrygia and the region of Galatia, and were forbidden of the Holy Ghost to preach the word in *Asia*." Acts xvi. 6.
>
> "And when Gallio was the *deputy* of Achaia." Acts xviii. 12.

CATECHISM, LITURGY, AND CHURCH HISTORY.

DIVISION I.

SECTION I.—1. "What is thy duty towards thy neighbour?" Write the answer to this question, and give a Scriptural illustration of four consecutive clauses of it.

2. "Why was the Sacrament of the Lord's Supper ordained?" Illustrate from Scripture the answer to this question.

Section II.—1. Write the last sentence in the "Absolution," and the four first verses of the "Te Deum." What Psalms (besides those for the day) are used in the office for Morning Prayer, what Hymns, and what Canticle?

2. What is a Litany? When is the Litany appointed to be used? Give supplications from the Litany which belong respectively to, the Invocation, the Deprecation, and the Intercession. To whom do we specially address ourselves in the Deprecation, and why? What sins do we specially pray to be delivered from?

3. Give some account of the order of the ecclesiastical year.

Section III.—Write out one of the following "Articles of Religion," and prove it from Scripture:—

1. Of the resurrection of Christ.
2. Of the Old Testament.
3. Of Christ alone without sin.

DIVISION II.

1. Give some account of the persecutions of the early church.

2. What is known of the history of the church under the following Emperors: Trajan, Marcus Aurelius, Constantine?

3. Who were the Apostolic Fathers? Give some account of Polycarp.

4. What authors wrote against Christianity, and who were the apologists of the early church? Give some account of one of them.

5. Give some account of Irenæus, Cyprian, and Origen.

6. Give some account of the conversion of the Anglo-Saxons.

7. On what principal occasions before the Reformation, and for what causes, did contests arise between the State in England and the Pope?

8. Against what practices and what doctrines of the Church of Rome did the reformers in England chiefly protest? Give some account of John Rogers, Bishop Hooper, and Rowland Taylor.

ENGLISH GRAMMAR, AND THE HISTORY OF ENGLISH LITERATURE.

DIVISION I.

Section I.—1. Define an article, an adverb, and a preposition; give the etymologies of these words, and examples to illustrate the definitions of them. When is the article *a* to be used, and when *an*?

2. How do nouns ending in *y*, *fe*, and *f*, respectively, form their plurals? Give a reason for the rule in the last case, and state the exceptions. How do nouns ending in *y* form the possessive case?

3. Distinguish between a proper and a common noun, and define a collective noun and an abstract noun, giving examples of each.

Section II.—Parse the words printed in italics in one of the following sentences. Paraphrase and explain the last sentence.

1. *Him* the Almighty *power hurled headlong.*

2. *Give me that book, that I may read it, for* it is *mine.*

3. The *mind* of man *being* naturally *limited,* it is *impossible that all* its *faculties can operate* at once; and *the more any one predominates,* the *less room* is there *for* the *others* to exert their vigour.

Section III.—Paraphrase one of the following passages from Milton's Paradise Lost:—

1.

Thus far these beyond
Compare of mortal prowess, yet observed
Their dread commander; he, above the rest
In shape and gesture proudly eminent,
Stood like a tower: his form had not yet lost
All her original brightness, nor appeared
Less than archangel ruin'd, and the excess
Of glory obscured: as when the sun new-risen
Looks through the horizontal misty air,
Shorn of his beams; or, from behind the moon,
In dim eclipse, disastrous twilight sheds
On half the nations, and with fear of change
Perplexes monarchs: darken'd so, yet shone
Above them all the archangel: but his face

Deep scars of thunder had intrench'd, and care
Sat on his faded cheek; but under brows
Of dauntless courage and considerate pride
Waiting revenge. Book i.—587.

2

O, myriads of immortal spirits! O, powers
Matchless, but with the Almighty; and that strife
Was not inglorious, though the event was dire,
As this place testifies, and this dire change
Hateful to utter: but what power of mind,
Foreseeing or presaging, from the depth
Of knowledge past or present, could have fear'd,
How such united force of gods, how such
As stood like these, could ever know repulse?
For who can yet believe, though after loss,
That all these puissant legions, whose exile
Hath emptied heaven, shall fail to reascend
Self-raised, and repossess their native seat?
For me, be witness all the host of heaven,
If counsels different or dangers shunn'd
By me have lost our hopes: Book i.—622.

Section IV.—1. What are the different sounds of the vowels?

2. Distinguish between the uses of *shall* and *will*. What rule is applicable to this distinction?

3. Give an example of an *assertion*, point out its *subject* and *predicate*, and define these terms. Give examples of other parts of speech than nouns or pronouns used as *subjects*. In what sense are they so used?

DIVISION II.

Give some account of the life and writings of one of the following authors:—

1. John Milton.
2. John Dryden.
3. Samuel Johnson.

HISTORY.

DIVISION I.

Section I.—State the principal events in the history of England during one of the following centuries:—

1. The ninth century.
2. The fourteenth century.
3. The sixteenth century.

Section II.—Give some account of one of the following reigns, stating what you know of the manners and customs of different ranks of society at these periods.

1. Edward III.
2. Charles I.
3. George III.

Section III.—Relate the principal events in the history of one of the following periods:—

1. The settlement of America by the English.
2. The conquest of British India.
3. The wars with France from 1793 to 1815.

Section IV.—1. Give an account of the causes which led to the formation of a standing army in the United Kingdom, and of the reasons which have been alleged for and against such an institution.

2. What are the several functions of a judge, and of a jury, in the administration of justice?

3. What are the several stages through which an Act of Parliament must pass before it becomes part of the law of the land, and what are the advantages of each of these stages?

DIVISION II.

1. Give some account of one of the following eminent persons of antiquity:—

Themistocles.
Caius Marius.
Pompey.

2. When, and under what circumstances, were knights of the shire and burgesses first called to sit in parliament?

3. What were the chief provisions of Magna Charta? Mention instances in which they were violated.

4. Give examples of the assertion by parliament of its independence, and of the responsibility of the ministers of the crown. Under what circumstances were these rights finally established?

GEOGRAPHY AND POPULAR ASTRONOMY.

DIVISION I.

SECTION I.—Mention in succession, or draw a map to show, the principal headlands, bays, rivers, and sea-ports, on one of the following coast-lines:—

1. The Southern Coast of England.
2. The Eastern Coast of Scotland.
3. The Eastern Coast of the United States.

SECTION II.—Give some account of one of the following countries:—

1. Australia.
2. Russia.
3. Austria.

SECTION III.—1. How is it known that the fixed stars are greatly more distant from us than the sun?

2. Explain the phases of the moon.

3. Explain the causes of eclipses of the sun and moon, and of the different kinds of eclipses. Why do not eclipses occur every month?

SECTION IV.—Draw a map, showing the mountain and river systems of one of the following countries; mark the principal towns on the rivers, and trace, if you can, the river basins:—

1. England north of the Wash.
2. Spain.
3. South America.

DIVISION II.

1. Give some account of the winds which prevail in different regions, of their causes, and of their influence on the climates of those regions. Why is the climate of a western coast in the temperate zone always milder than that of a corresponding eastern coast?

2. Give some account of the prevalent rains of different regions, of their causes, and of their influence on the river systems of those regions.

3. Give some account of the forms of vegetation which prevail in different regions, and of their connexion with the mean temperatures of those regions, as shown by the isothermal lines. What are the vegetable substances chiefly used as food by different races of men?

4. Give some account of the Table lands of the New World.

5. The surface of the globe may be divided into two hemispheres, of which one contains nearly all the land, and the other little but water; where must a line be drawn to separate these hemispheres, and how does Great Britain lie in respect to it?

6. Mention some of the obvious characteristics of the human race in the tropical regions, the polar regions, and the temperate regions of the earth, respectively. What difference is apparent in the law of the geographical distribution of the lower animals and of man?

LETTERS OF A GERMAN ON ENGLISH EDUCATION.

Translated from the German of Dr. Weiss, Professor of Joachimsthal College at Berlin, by Dr. A. Selfs.

(Continued from p. 53.)

TWELFTH LETTER.

National Education.—The Part which Church and Government take in it.—Opinions of the English respecting the Instruction of the People in Prussia.—Compulsory System.—Sunday Schools.—Joseph Kay on the Social Condition and Education of the People in England and Europe.—Self-government.—Effects of Liberal Principles.

By the term, *National System of Education*, the English designate that school instruction which is given to the lower classes of the people, by authority and disposition of the Established Church. In Prussia, the government has long ago, but particularly since the expulsion of the French, taken upon itself the care of establishing schools where the children of the poor might be taught. The English authorities have only of late adopted the same plan, and begun to realize it by degrees. People are there generally of opinion that it is, by order of nature, the business of the parents to educate their children, and if they cannot themselves fulfil this duty, it must devolve next upon the community or the parish, so that the Church becomes the heir to this charge. The government is not allowed to meddle directly with national schools; it needs only to supply them with its occasional assistance. A great part of public affairs is there discharged by corporations, which are in the same measure unwilling to extend the influence of government in national education, as they are afraid lest it should encroach upon their own rights.

In Prussia, the education of the people is a public business, for the state must be sure that its subjects will be fit for its use. The educational system stands there in close connexion with the military system, according to which every member of the male population is to bear arms; therefore Prussia has been compared to ancient Sparta, not only by the court poets of Frederic the Second, but by many more since that period. Its laws and measures with respect to education have often been spoken of with unjust exaggeration by the English. In all their debates on educational questions they look with a kind of horror on a system which they usually style the *compulsory system.* Lord Brougham has talked of the training and drilling by military chiefs, that was established in our schools for the people; Sir Robert Peel shrunk from a system which encroached upon the personal liberty of parents, and intruded upon their religious liberty. Others have added, it became a government very ill to be the "whipper-in for hunting after useful knowledge." The Earl of Arundel, a man of noble and prudent principles, has said in Parliament, "If the last end of all education and of all knowledge be to rear man to the feeling of his moral dignity, and of his responsibility before Heaven, the Prussian system of instruction is a failure, for it trains the mind from infancy to submit to the rules of convention imposed by the state upon each of its subjects; therefore it is not an education which ennobles the character of man, but which debases him." The most excessive terms, in describing the *bureaucratic* and drilling school-system of Prussia, have been used by Laing in his Travels.

They are unjust towards us, because they do not sufficiently know us, and do not take the trouble to observe us accurately; only so much must be admitted, that by too much administering and prescribing we have perhaps endangered the principal end of education, in our constant endeavours to bring the means to their greatest perfection. However, censurers and adversaries like those mentioned are at least instructive in some degree, and much preferable to those liberal praisers who, like William Fox and Roebuck, wish only to enlighten the people in order to carry out their party views, and have only for this reason stooped to recommend the Prussian compulsory system.

The majority of English people have, as I said, until lately been hostile to every governmental system of instruction, and adhered strictly to the old custom, which for centuries left instruction entirely in the hands either of the parents or of the parish. Thus it happens, that a singular irregularity and incoherence strike the view of an observer who is accustomed to our well-ordered school system. Here, he sees places where the parson has vied with the proprietor in establishing unions, and has called into existence seminaries for education that are highly flourishing and successful; there, he finds ragged schools, supported by the scanty contributions of an impoverished neighbourhood; here, establishments for the further education of adults of both sexes; there, schools of industry, or infant and Sunday schools. Sometimes all these kinds are met with in one place, and a few miles off there occur large tracts without the slightest accommodation for instructing youth, who are left to grow up in a rude state of ignorance. Now and then a clergyman will be discovered who, according to Chalmers' principles of poor-house institutions, never offers assistance to the indigent population but with their own co-operation, and who has, with true wisdom and charity, managed so to establish a self-paying system of national education; and perhaps, a small distance further on, an old educational foundation, with all its wealth, is wasted and carelessly squandered, because there is no proper superintendence and administration for the schools of the country.

This contrast of abundance and utter neglect cannot but leave a very painful impression, that if the immense stock of voluntary contributions for ameliorating the social and intellectual state of the poor people were but well administered and proportionally distributed, many thousands would be relieved who now live in deep ignorance. Large funds are often spent in building magnificent school-houses, on a scale to which the importance of the school bears no proportion. Indeed, it is undeniable that the English educational establishments are outwardly superior to those of the Continent, and can boast of a more suitable arrangement; also, the Minutes of Parliament begin with proposals concerning the erection of schools; but we cannot help thinking that there is a certain vanity at work which makes rich people build grand houses for education, and display thus, rather than in other ways, the interest which they take in its cause: it appears that the benefactors desire to put a very palpable proof of their munificence before the eyes of the world, while they hardly trouble themselves about the design and the intrinsic requisites of their new-built establishments. This restriction of their liberality has often been deeply regretted.

It is a fact that national education has of late been promoted immensely by the voluntary efforts of the English nation at large, and has thus met with higher improvements than the care of the most conscientious government might have been able to grant. Yet these private contributions are too isolated, and whatever is performed by the parish and Sunday schools is not yet sufficient for the wants of the people. The last-mentioned schools, and especially those of Scotland, are very numerous in some towns, but they teach only religion, and this task they fulfil excellently. Edinburgh, for instance, has several Sunday schools, which assemble nearly fifty boys, from ten to fourteen years, in a room on Sunday, while there is no service. No more than ten form a class, instructed by the same master, in Sacred History. They sit, if possible, with their backs towards the rest of the classes; the superintendent walks about between the divisions, asks here and there a question, and then gives the signal for concluding. The whole never lasts above forty minutes, singing and prayers taking seven minutes, for fear that the children might be tired, and thus the entire purpose be frustrated. The masters give their lessons gratuitously, and often take the trouble of calling on the children during the week.

But, praiseworthy as are the endeavours of those gentlemen and ladies who so readily perform these Christian services, which in Ireland alone extended, a few years ago, to upwards of 22,000 infants, how trifling is all they can do, considering the large number of those who are still without any instruction. It is, besides, not enough to instruct the children only in the Bible. Though in former times the Sunday schools may have sufficed, yet now they can no longer do so; for we see, from inquiries made by Parliament, and from several books on national economy, that the intellectual state of the lower classes in England is at present on the lowest possible scale.

A very estimable and instructive publication, concerning the state of the lower population of England, has recently appeared at London. The gentleman who is its author spent several years on the Continent, with a view to inquire into the state of national education in Germany, Holland, France, and Switzerland. The title of the book is, "The Social Condition and Education of the People in England and Europe, by Mr. Joseph Kay, M.A., of Trinity College, Cambridge, Barrister-at-Law, and late Travelling Bachelor of the University of Cambridge. 1850." It is in two large volumes, which prove that the author has made a good use of his Travelling Fellowship; and as to the interest which he, as a lawyer by choice and profession, can take in matters of education, I have had occasion to experience its liveliness by conversations I had with him, much for the good of my own information.

Pained by the neglected state of national education in his country, Mr. Kay describes the impression which the well-ordered arrangements of the Prussian town and country schools made on him in terms of approbation which, in several instances, exceed the limits of just appreciation. Sometimes a single fact, from which he formed hastily a general opinion, has induced him to take the intention of our institutions for the performance, however true it may be that we can in general justly boast of a higher standard of national education than the English, and that our educational as well as our military universalism, implies preferences which they cannot exhibit. But too frequently the defects of his own country render the writer rather partial to our institutions. Since the accumulation of large property in the hands of a few, renders, in England, a free and independent peasantry impossible, and since the tenants live there, in many places, in a deep state of deprivation and indigence—for a great number of people with no property always turn into an excitable and dangerous rabble—he defends the division of the soil into small parts. At the same time, our seminaries for schoolmasters appear to him in a highly creditable light, because in England there is a great want of teachers for the people. No less has our rich educational literature attracted his admiration. We must be highly indebted to Mr. Kay for his endeavours to refute many foolish traditional errors of his countrymen respecting our schools. He uses the following words:—"Whenever you talk of German schools, one may be almost sure to hear you hinting at centralization, at irreligion, at communities being prevented from free action, at compulsion by power of law to send children into a certain school, at disunion between Church and schools, and so on, as if schools were prisons there, into which government confined the children during the day against the will of their parents, in order to train them in a military way. These are so many untruths, or at least exaggerations—and he who will see that the Prussian government does not limit information, nor distribute it according to differences of birth, needs only enter the first gymnasium or *bürgerschule*—he will find the sons of the noblest families next to those of low workmen."

I have mentioned this accurately-written publication particularly, because it shows how much ignorance, want, and indigence have of late increased among the poor people of England. The utmost apprehensions for the social welfare of that country would hence arise if we did not know that many eyes there are yet open to this danger. The statistical accounts occurring in the book, state that in England and Wales there are eight millions of people who can neither read nor write,—that more than half the children between five and fourteen years do not go to any school, —that between 1835 and 1846 no less than £27,254,541 have been spent by Government for poor people, independent of the sums given by private persons, and that, at present, five millions are every year thrown into this gulf; and yet all these numbers cannot make the impression which is produced by the very description of the moral state of the people, and the utter neglect with which it has been treated hitherto. He leads us into the prisons—into the dwellings of country-people and manufacturers—into the narrow lanes of the larger towns, and thus renders us witnesses of the endless misery and of the horrid scenes that are there to be met with:

There is nothing, according to the writer's opinion, that might remedy this wretchedness of the people, but schools; not those of the present day, but such schools as the State is going to erect and administer in future with greater regularity. For in those spheres of society, the indirect means of education which regulate elsewhere the life of the nation, have too little power, and the Church did never, until now, much trouble herself for the welfare of the people. Mr. Kay shows, as well by his own statements, as by the accounts of others, how insufficient the existing national schools are, how destitute of proper direction and management, and how much they suffer from want of fit masters—as frequently in the country, or in small towns, the schools are still conducted by females, or by such men as have not been found good for anything else. He relates that, often for want of a better place, they pressed their flock of pupils into cellars, kitchens, garrets, and stables. In many a village-school, the children are obliged to stand the whole time; and I leave any one to imagine how this torture must disgust the little ones with their school. In what a state must, under such circumstances, be the books, and the other means of instruction!

He desires to see in England, national education so ordered as he thinks it is in Prussia. But yet more, the system existing in some states of North America, particularly in Massachusetts, would correspond with his wishes. The strict and severe morals of the first colonists, being of Puritan religion, have taken root and been preserved there. Any citizen, whatever be his profession or his sect, is entitled to make use of the parish-schools, but every member of the state is also bound to pay his tax for their support. This school-tax is there readily given, so that for any improvement which might be desired, the means are at hand. In England a school-tax of seven millions would be sufficient to supply the wants of the people; nor will this sum be found extravagant, considering the amount spent by the country in the cause of emancipation. The difficulty would be less to raise the said sum for the annual wants of national schools, than to find the people that would accept it under the conditions that would be annexed to it.

The English government is opposed in its endeavours for education, on the one hand, by those that are jealous to preserve the principle of independent and self-government unaltered, and on the other, by the Church party. The one as well as the other, fear, *Danaos, et dona ferentes.* For if education, they say, were in the hands of government, opportunities would be had for making it a political engine. The one is afraid lest education might be drawn into the current of political vicissitudes, and lest a palsying centralization and a restraining uniformity might injure its improvement; and the others protest against a mere development of the intellect, without due regard to religion, as this system would turn out the curse of education. The State, as they say, would be compelled to consider too many sects, and to adhere, therefore, to a comprehensive system for all; thus it would take a latitudinarian position with respect to religion, by which no sect at all would be satisfied.

There are some others that will not hear of any national education at all, and for whom even that existing is already too much. Their opinion can hardly be expressed in stronger terms than those of Mandeville, whose argument against the instruction of the people is quoted by Whately, as follows:—"If a horse knew as much as a man, I would not be his rider." They cannot conceal their indignation that this question is constantly renewed, as the Government seems determined to bring it to a final solution. When Parliament interfered, by considerations of humanity, with the abuse made of children in some manufactories, there was no considerable opposition; and yet it was an open intrusion on private rights. Far more opposition would arise, if it should attempt to procure instruction to the lower classes of the people.

The crowded meetings that assemble for the discussion of the best system of national education, give a very gratifying proof of the serious intentions and the readiness for sacrifices that prevail throughout the nation in behalf of national education. They meet together not only to protest and to put forward their views, but they display an activity which their adversaries are obliged to encounter by appealing likewise to the country. Thus a great part of the burden is taken from the shoulders of the Government, which, of course, must carry the principal measures in the question.

Three parties are clearly to be distinguished with different views of national education. The first, is the exclusive Church party; the second, the moderate Church party; and the third, the secular section which has arisen, particularly, by the violent exertions of the first. I intend to give some account of them in my next letter.

TRANSLATIONS OF THE CLASSICS.

(*Continued from p.* 55.)

THE ILIAD OF HOMER.

The "Iliad of Homer, literally Translated: with Explanatory Notes. By Theodore Alois Buckley, B. A., of Christ Church." Here we have what Goethe wanted, a translation of Homer's Iliad into prose. But it is a literal translation, and perhaps Goethe did not want that. Let us first discover what a literal translation is, if we can. If we do not know what a literal translation is, perhaps we shall find it out by comparing this with Homer, for this is a literal translation. A literal translation does not keep to the order of the words in the original; at least this translation does not. Nor does it always give the plain simple meaning of a word. An example will explain this. In Iliad, ii. v. 603, the version is, "Those who possessed Arcadia under the breezy mountain of Cyllene," on which version there is a note, "*i. e.* lofty." The original then means 'high' or 'lofty,' as the translator has it; but he puts 'breezy' in the text in place of 'lofty.' Cyllene is a huge mountain mass. It is a striking object; and Homer, after his fashion, gives it the epithet 'high,' and so by a single word places it before us. In a literal version 'high' is thrown out, and 'breezy' is put in. A literal translation also does not give all the words of the original: it omits some. Thus, in Iliad, i. 29, the version is, "Sooner shall old age come upon her, at home in Argos, far away from her native land," &c. The original is, "Sooner shall even old age come upon her in our house, in Argos, far from her fatherland." The following translation seems to help us to the notion of a literal version (Il. iii. v. 53): "Then shouldst thou have known of how brave a man thou dost possess the blooming spouse." This is not English; and that seems to be one meaning of 'literal.' It is an attempt to follow the Greek construction, instead of the English; and this seems to be another meaning of 'literal.' The verse ought to be translated, adopting nearly the translator's words, which are far from being the best: "Then shouldst thou have known how brave a man he is whose blooming spouse thou dost possess." The only conclusion that can be made is, that a literal translation is a translation to help boys to learn their lessons. But this translation will not help them to please a good teacher.

As we have said before, a translation of Homer is a very difficult thing; and if it were done by the ablest hand, it would often be blamed, and perhaps justly. The meaning of many single words in Homer is uncertain, and the exact translation of many passages is doubtful, even where the several words are well known. Any man who attempted a version would find it difficult to satisfy himself; and all fair critics would make great allowances. We are quite willing to do so in the present instance; and perhaps we may say that this is a better version than some men would have made, and better than would have been made half a century ago. The author says "that it is based upon a careful examination of whatever has been contributed by scholars of every age towards the elucidation of the text, including the ancient scholiasts and lexicographers, the exegetical labour of Barnes and Clarke, and the elaborate criticisms of Heyne, Wolf, and their successors." The exegetical labours of Barnes would not help him much. He adds what is quite true: "The necessary brevity of the notes has prevented the full discussion of many passages where there is great room for difference of opinion, and hence several interpretations are adopted without question, which, had the editor's object been to write a critical commentary, would have undergone a more lengthened examination." A translation of Homer seems to require some commentary, for there are passages where no version can give the full or exact meaning. The translator has used, among other books, Buttman's Lexilogus, and this work is certainly one of the best for his purpose that he could find.

Lessing (Laocoon, xiii.), in his comparison between painting and poetry, has some remarks on the passage in the Iliad (i. 44-52), where Apollo descends from heaven to bring pestilence among the Achæi. He says of this passage: "As much as the reality is above the picture, so much is the poet here above the painter. Furious, with bow and quiver, Apollo descends from the summits of Olympus. I see him not only descend—I hear him. At every step the arrows rattle about the shoulders of the angry god. He moves along like night. Now he sits opposite to the ships, and sends—fearfully twangs the silver bow—the first arrow against the mules and dogs. Next he attacks the men themselves with the more poisonous arrow; and all around unceasing the piles of wood with dead bodies blaze. It is impossible to transfer into another language the musical painting which the poet's words communicate to the ear." So far may serve our purpose.

This is the English version: "And he descended from the summits of Olympus, enraged in heart, having upon his shoulder his bow and quiver covered on all sides. But as he moved the shafts rattled forthwith upon the shoulders of him enraged: but he went along like unto the night. Then he sat down apart from the ships, and sent among them an arrow, and terrible arose the clang of the silver bow. First he attacked the mules and the swift dogs; but afterwards, despatching a pointed arrow against [the Greeks] themselves, he smote them, and frequent funeral-piles of the dead were continually burning." This is a fair specimen of the translation. The original is one of the finest passages in Homer, or in any poet. It is, as Lessing says, a whole gallery of pictures. It is impossible to translate it in such a way as to produce the effect of the original. Many critics may object to several things in the English version; but the chief objection is, that the author of a literal version has spoiled one passage by deviating from the original. The passage is, "But as he moved," &c. Whether he has well rendered the force of ἄρα, in the expression Ἔκλαγξαν δ' ἄρ οἰστοί, by 'forthwith,' or if a better word could not be found, I leave to the learned. He adds, in a note, that "the force of ἄρα is noticed by Nägelsbach;" but he has not informed us what Nägelsbach has done besides noticing it; by which he has gained no distinction. Nobody can help noticing it. The true version of the passage is something like this: "The arrows rattled on the shoulders of the angry god, as he moved;" which makes a difference, and a great difference, in Homer, who very often places the pause after the first word or the first pair of words in a line; and words so placed have a peculiar force, which is lost by putting them in any other place. This will seem a small matter to the schoolboys who use this version, and to the masters who make it their guide; but no good critic will consider it a small matter.

This specimen contains examples of one of the greatest defects of the translation. It is not expressed in plain, forcible English: it is not a fair sample of our language. Bad as English has been made, and it is daily growing worse, it is still not so bad as this. 'The shoulders of a man enraged,' or 'even the shoulders of a god enraged,' do not move me. His shoulders are before my eyes, and whether he is enraged or not I care not. I am directed to look only at his shoulders. I have heard of people who have discovered a peculiar virtue in the γένετο in the line

Δεινὴ δὲ κλαγγὴ γένετ' ἀργυρέοιο βίοιο ;

and so the translator seems to have done, for he translates γένετο, 'arose,' which spoils it, for the emphasis is on the 'terrible,' and the γένετο is simply 'was,' which is not emphatic. The translator has spoiled the musical painting. Then Apollo 'despatches' an arrow. 'Despatches' conveys no meaning. He sends the arrow, and it hits. Lessing has taken ἐχεπευκές in the usual sense. The author may have done better by the word 'pointed.' The last line would seem to an English reader who reads with care to contain an idle word; for 'frequent funeral-piles' means, I suppose, funeral piles often blazing one after the other; and a man might ask, what then does 'continually burning' mean? This difficulty would be removed by telling him that Homer is better than his translator; for he says, "and continually piles of dead bodies were burning crowded together." 'Crowded close,' or 'crowded together,' is, I believe, the meaning of ϑαμειαί: and if it is Homer's meaning, that is enough. The best lexicographers and interpreters say so. And this is the meaning of ϑαμειαί, in Il. xviii. 68, where this translator has it 'fleet ships,' either through error, or from following a different reading.

Homer never wearies us with a long description of the parts of a thing. Each thing has its place, its form, and its colour by a word or two. He gives us a series of pictures that move rapidly before us. If we cannot equal his language, owing to the defects of our own, we should keep as near to his language as we can; and that I call literal. In iii. 10 he compares the dust rising beneath the feet of the men as they march, to the mist that a south-wester pours over the hill tops. The translator has it thus: "As when the south-west wind sheds the mist over the top of a mountain, by no means friendly to the shepherds, but more serviceable even than night to the robber." One cannot see why 'mountain tops' in the original should be turned into the 'top of a mountain,' particularly in a literal version; nor why the simple line, "to shepherds no way pleasing, but to the thief better even than night," should be so strangely disfigured by 'serviceable;' nor why a thief who steals sheep in a fog should be made into a robber who takes them by force. There is no cure for this but to read English writers who can write English, and to try to seize somewhat of their spirit—the translation of the Old Testament, the book of Common Prayer, and him who saw like Homer, and who dared to say,

Night's candles are burnt out, and jocund day
Stands tiptoe on the misty mountain's top.

The translator next deals with a hungry lion (iii. 21), and it is a warning to all people: he is overpowered by the lion: "But when Mars-beloved Menelaus perceived him (Paris) advancing before the host, taking long strides, as a hungering lion exults when happening on a carcase of large size, having found either a horned stag or a wild goat. For he greedily devours it, although swift hounds and vigorous youths pursue him. Thus Menelaus rejoiced, having beheld with his eyes god-like Alexander. For he thought that he would be revenged on the guilty wretch: forthwith, therefore, with his arms he leaped from his chariot to the earth."

Ares is changed into Mars, as Achæi are changed into Greeks, in most parts of the translation; and so on. This is not literal: it is false. But the worst is, that the whole passage is made pure nonsense, as every one may see: the comparison is destroyed. Perhaps a very careful reader might find out the meaning, though the "For he greedily devours it" is rather puzzling. Why does he greedily devour, and why does not he leave his prey? Because he is hungry, says Homer; and he shows this by the order of his words. Homer places before us a lion lighting on a great prey; it may be a horned deer or a wild goat; and he is hungry, for he goes on greedily eating, though the dogs and the huntsmen are close upon him. His hunger and his greediness are no part of the simile: they are part of the picture. As a lion delights in falling on his prey, so Menelaus delights at the sight of Alexander; "for he said to himself that he would punish the evil-doer; and straightway from his chariot with his arms he leapt to the ground." What the author of this literal translation has gained or lost by altering the order of the words in the last line, anybody can see.

It is Homer's fashion to use certain forms of expression as often as he wants them. Having got one that suits him, he sticks to it, and so should a translation, whether it is literal or not. Thus there is, in Il. iii. 39,

Δύσπαρι, εἶδος ἄριστε, γυναιμανές, ἠπεροπευτά,

which is translated: "Cursed Paris, most excellent in form, thou woman-raving seducer;" a very bad version. The same line occurs in Il. xiii. 769, but it is there translated thus: "Accursed Paris, fine only in person, woman-mad, seducer."

As a sample of a version poor and inaccurate, take Il. xviii. 65, where Thetis with the Nereides passes through the sea, and comes to comfort her son. The original is full of beauty and tenderness; and we must not blame a translator if he does not come up to the original. "Thus having spoken, she left the cave; but they all went along with her weeping, and the wave of the ocean was cleft around for them. But when they reached fertile Troy, they in order ascended the shore, where the fleet ships of the Myrmidons were drawn up round swift Achilles. Then his venerable mother, shrilly wailing, stood near to him deeply lamenting, and took the head of her son, and mourning addressed to him winged words."

In place of 'they all went,' &c., it would be better to say 'the Nereides;' and the version would be, "and the Nereides with her weeping went;" for the word 'all' is not in the original; and though it is very immaterial, one does not see why it should be put in. On the word σφίσι (v. 66) there is a note: "σφίσι is the dativus commodi." Perhaps it is; but this is miserable slang, though it is in vogue. But the translation is bad: the original is, "and around the wave of the sea divided for them," or 'opened for them.' 'Cleft' seems hardly a fit word, though the translator may defend himself by the ordinary and simple meaning of the root ῥηγ. "They in order ascended the shore." In what order? The original is, "they came up on the shore one after the other (ἐπισχερώ), where crowded (θαμειαί) the Myrmidons' ships were hauled up about swift Achilles." What follows is very bad. Homer places the thing before us thus: Achilles is groaning deeply, and his mother stands by his side; she gives a shriek, and lays her hand on his head, and with tears addresses him. The translator makes her 'wail shrilly' before she stands by him. Homer knew better than that. The mother rises from the sea, and is by the side of her son before he sees her: he is too deep sunk in sorrow to observe the approach of the goddess. Besides, deities do not walk: they glide along. Then she utters a cry and puts her hand on his head. The mother is by the side of her son, and wakes him from his grief by a cry and laying her hand on his head. Look at the two pictures. What could be more unlike?

The translator may have done well sometimes, though it is not easy for one to discover it, whose objections are against the whole form of his version. The object of these remarks is not to examine into little niceties of language, or to detect error where it is palpable; but to show that the whole thing is ill-conceived, that a version should be made on a different principle. It should never leave the form of the original, when it is not necessary; and it should always give up the form of the original, when this is necessary to express the meaning in English. All unmeaning words should be banished, and words with meaning should be put in their places. If there is a choice between two words, the plainer Saxon word should be preferred; and uncouth terms should be cleared away, such as this (Il. i. v. 8): "Which, then, of the gods, engaged these two in strife, so that they should fight?" One may safely 'engage' to say, as some would say, that there is not a worse translated verse in the whole book. It mistranslates the infinitive *μάχεσθαι*, though the English has an infinitive that is used like the Greek infinitive. But 'these two' did not fight; the original is *ἔριδι ξυνέηκε μάχεσθαι*. The word 'engaged' is a barbarism here.

No doubt a skilful hand might clear away much of the rubbish of this version, and make it better. If this should be done, I particularly request that Hephæstus, *alias* Vulcan, may not be left to make Achilles' shield (Il. xviii. v. 477), with 'a forceps' in his hand. A plain pair of pincers, such as the translator may see in any smithy, is the true thing. The translator has also (Il. iii. v. 47), some 'congenial associates,' whom he had better part with; and some other title than 'venerable' must be found for Thetis, in a country where archdeacons are 'venerable.'

Among the many scholars who have leisure, and knowledge, and the blessing of a competent income, with the very dubious blessing of little to do, are there none who would undertake to make translations of the best of the Greek and Roman writers?—such translations as should be worthy of the originals, and improve the taste of our people? The thing is worth doing, if it is done well; and it cannot be done well without much time. The author of this version of Homer is probably a young man, who has done the work in a very short time. It might be a respectable thing for a young man to do, and keep it by him, at least the time that Horace recommends, before he sent it out. But to publish such a thing in its present form, is to invite criticism as well as purchasers. If the book sells, the translator may have the opportunity of mending his work; and I doubt not that, if he has time allowed, he will do so.

All this translating and school-book making is not a sign of improvement; we are overloaded with books, when we want good teachers, scholars, and men of sense and taste. There is a rapid change in opinion going on. Classical studies are giving way to other things. Some of the public schools and the Universities of Oxford and Cambridge may affect to treat this as idle talk; but it is not so. People will learn what is useful, and will not be content with the useless. Better far, they will say, and truly say, to learn something that is real knowledge. Better to admire the beauty of plants and flowers, and to study their wonderful and varied forms and uses; to know the substances that are useful for man, to reduce them to their elements, and to combine them in new forms; in fact, anything rather than waste our time over books about Latin and Greek, and learn nothing in the end. And yet the knowledge of antiquity cannot perish, for it is part of the general stock of knowledge. It has its uses for those who can afford the time for its study; and one of its chief uses is to form the taste. The Greeks had the perception of beauty; they are our teachers in art. The greatest thing that man has yet produced in its kind, is the sculpture of the Greeks. It is the beautiful in a sensuous form. The true object of sculpture is the beautiful, but the ideal beautiful. The Greeks are the only people who have attained this, and it never will be attained again. It remains for us to admire. Their language in its best form and its best examples is also a model: the same taste that gave them the true principles of art in sculpture, gave them the perception of propriety of language. Modern languages are liable to change and corruption; and the best age of ours is certainly passed. We must therefore keep to the old and the fixed, if we would maintain taste and propriety of speech. For this purpose, the careful study of the best Greek and Roman writers is a good study; and good translations of them are useful, though they can never stand in place of the originals. Those who would have us be content with translations, because they can tell us all that the originals do, mistake the matter; for it is not so much what the ancient books tell us, though that is something, as the way of telling it, that we must look at. What Homer tells us is not very material, and to many people is quite immaterial. But the way of telling it is something; and this specimen will show the difference between one way and another. We have casts of statues and parts of statues. A cast never renders all the effect of the original, even if it is a good cast; there is something in the marble that is not in the cast. But a good cast is a good copy, a good likeness. A bad cast is a bad translation, a frightful caricature. G. L.

ST. THOMAS CHARTERHOUSE SCHOOLS.

During the past month the new schools in connexion with St. Thomas Charterhouse have been opened. We gave a detailed account of the progress and prospects of education in this district in our number for January last; and we have now the pleasure of stating, that through the indefatigable exertions of the incumbent, the large sum of money which their erection cost has nearly all been raised. 400*l.* more, in the form of subscriptions, will release him from his pecuniary responsibilities. This is surprising, when we consider that 5245*l.* had to be raised to meet the whole outlay, and that less than 100*l.* have been collected from the district itself, for the education of the inhabitants of which the schools have been erected. On the 17th ult., the friends and supporters of the schools assembled in one of the largest rooms in the building, and the Lord President of the Council took the chair at three o'clock, surrounded by a large number of distinguished personages, consisting of noblemen, prelates and clergy, and other distinguished educationalists.

The ceremony was commenced by the children and teachers chanting the 127th Psalm, after which was said the collect for *Direction and Success in all our Undertakings*, and the following prayer:—

O God, from whom all holy desires, all good counsels, and all just works do proceed, we thank thee that thou didst put it into the hearts of thy servants to commence this building; and hast enabled them to bring it to completion. We pray that the work to be carried on within these walls may be regarded with thy favour, and furthered by thy continual aid. We know, O Lord, that it is not good for the soul to be without knowledge; and that man without understanding is compared to the beasts that perish: grant, we beseech thee, that these schools may, by thy grace, be the means of enlightening the understandings, and training the souls of many in knowledge. We are taught that the foundation of real knowledge is first to know thee, the only true God, and Jesus Christ whom thou hast sent. Upon this foundation thy servants build. We pray thee, therefore, that through instruction in thy holy word, the children of many generations may be here trained up in thy true fear and love, and may go forth to the duties of their several stations, and may adorn the doctrine of God their Saviour; thus they who have united in the work upon which we now implore thy heavenly benediction may reap the fruits of their zeal and bounty, by seeing an increase of godliness and industry among thy people, to the welfare of the nation, and to the glory of thy holy name. These and all other mercies we ask in the name of Jesus Christ, our only Mediator and Advocate. Amen.

Our Father which art in Heaven, &c.

The 100th Psalm was then sung, and the Lord Bishop of the diocese pronounced the blessing.

The Lord President was then requested by Mr. Rogers, who gave an outline of the prospects and objects of the schools, to declare them open. Earl Granville, the Bishop of London, the Duke of Argyll, and the Dean of St. Paul's, all spoke in high terms of the exertions of Mr. Rogers in establishing these schools, and thus procuring so great a prospective blessing to the district. The proceedings terminated by the children singing the National Anthem. The building, which is in the Byzantine style, and has been erected after the designs of Mr. Hesketh, has cost £3745, exclusive of £1500 for the purchase of the site. Of this sum nearly £2000 have been granted by Government, the other, except the deficiency already referred to, has been raised by donations and subscriptions. The schools will afford accommodation for between 900 and 1000 children. The two rooms on the second floor will be occupied by boys; on the first, by girls and infants; and the lower parts of the building will be occupied by a school of design, in connection with Marlborough House, for both day and evening scholars, and by premises for domestic and industrial training.

We have not space to give the whole of the speeches, but append those of Mr. Rogers and the Bishop of London.

The Rev. Mr. Rogers (incumbent of St. Thomas Charterhouse), in calling upon the Lord President of the council to declare the schools opened, expressed his hope that his lordship was satisfied with their arrangements. There were still a good many things to be finished, but he hoped that in a week or two they would be open for the reception of scholars. These schools had been commenced in a blacksmith's shop, and the numbers of the scholars had then gone on increasing until they reached 800; they had, however, in consequence of want of room, been obliged to dismiss 200 of the scholars, and they had now therefore only 600. What had been done in that district, which was inhabited wholly by the middle and labouring classes, was sufficient to show that with moderate attention and exertion schools might be raised in every parish. These schools were intended to be really national schools, where all classes might obtain education at a moderate rate. The payments would range from 2d. a week to £1 per quarter, but the children of the lower classes would not be excluded from the upper school, where education would be carried further than in the lower, provided that they showed sufficient talent to be admitted into it, and that their parents were willing to allow them to remain a sufficient time to profit by the instruction given them.

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The Bishop of London expressed the great satisfaction which he felt at being present on that occasion, and his sense of the great exertions which Mr. Rogers had made for the promotion of education in that district. He participated with that reverend gentleman in the thankfulness which he expressed to her majesty's government for the liberal aid which they had afforded him in carrying out his object, without which, as he had justly observed, it never could have been effected. The government had now for some years been duly impressed with the immense importance of promoting the cause of education. They felt that not only the dearest interests of the country, but even its stability, were involved in the extent to which education was given to the people. Education—by which he meant the complete intellectual, moral, and religious training of man—was now the great necessity of England. When he talked of education, he meant in the first instance holy education—education in the holy principles of our religion; and he should be especially wanting in duty to that Church over which he was a ruler, if he did not say that he meant by holy education a Church education. He did not mean to say that other religious bodies did not give a holy education, but when he himself used that term, he meant a Church education. The doors of Mr. Rogers' schools would always be open to the children of persons whatever might be their religious opinions, but nevertheless the schools must be Church of England schools. There were in this parish 9000 to 10,000 persons, none above the middle or lower rank of life, and he would invite those who wished to convince themselves of the absolute necessity there was for the educational provision which had now been made, to visit the lanes and alleys and see how they swarmed with poor children who had for many years been totally neglected. While insisting upon the necessity of giving a religious education, he did not, however, undervalue other branches of knowledge which tended to increase a man's usefulness in this life. It could not be maintained that a man would be a worse Christian if he were a better artisan or mechanic. Her majesty's government had done their best to promote education by removing the great obstacle to its spread, the want of efficient teachers, and he must express to them his thanks for the liberal, and in most respects judicious, manner in which they had exercised their powers. Some years might elapse, but eventually the effect of this school must be seen in the great moral and social improvement of the neighbourhood in which it had been established.

Notices of Books.

DIRECTIONS FOR INTRODUCING THE FIRST STEPS OF ELEMENTARY DRAWING IN SCHOOLS AND AMONG WORKMEN. SMALL 4TO. *Chapman & Hall.*

THIS work, by the author of a favourite little volume, "Drawing for Children," is prepared and published at the request of the Council of the Society of Arts, and is especially intended to assist the endeavours that are now being made to introduce drawing into elementary schools.

In his introductory chapter the author remarks upon the injurious effects produced upon Art by the loose manner in which drawing is usually taught in our middle and higher schools, "where it is looked upon as an extra not as a serious study, to which time and attention must be given. Accordingly the pupil does a little and the drawing-master a good deal; the master gets the profit, the honour goes to the pupil, who, suspecting how matters stand, resolves not to put pencil to paper afterwards, and adheres to his resolution." He considers that it is not possible (to which we should add not desirable) to introduce the teaching of drawing as a fine art; but maintains that a knowledge of rough elementary drawing will be much more useful to the pupils than the knowledge they usually obtain, for it induces more accurate observation, and disciplines the powers on which manual skill and intellectual and moral conduct depend. He also maintains that it is within the power of any master of a national school, with a simple and economical plan put before him, to instruct himself in this rough elementary drawing sufficiently well to teach it to his pupils. It is the object of the volume to put forth such a plan; and we feel bound to say, after a careful perusal of it, that it does so successfully. The instructions are minute and intelligible, and there is ample information as to the cheapest materials and the means of procuring them, lists of simple objects, drawing copies and specimens of rough common papers that are suitable for the purpose, and which may be met with at any country grocers. We extract the following details, which are intended for the information of those who have not learnt drawing:—

"A schoolmaster unacquainted with elementary drawing may be enabled to teach it with gradually increasing success, if he will attend to a few plain directions, and provide himself with the requisite copies and objects. If he be quite unpractised in drawing, he is recommended to practise a little before he begins to teach; or, at least, to copy previously the drawing-copies his pupils are about to use, and to draw a few of the simplest objects. Neither he nor his pupils can be expected to do very well at first; but both will improve rapidly by careful practice, and he will learn much by examining and correcting his pupils' drawings.

"The master commencing the tuition of Drawing with young pupils should be prepared for every conceivable blunder, and for many wholly inconceivable and unexpected. These he must meet with firmness and gentleness, never tiring of correcting errors that his pupils appear never tired of committing. If he lose his temper, he will only create dislike of himself, his instruction, and drawing also. If he grow careless with these young blunderers (who are likely to be the majority of his class), on the ground that it is impossible to teach them because they have no taste or capacity for drawing, he may rest assured that he has mistaken his vocation. All beginners are awkward at first: they cannot help it, and are not to blame for it; and if they be given up on such pretext, few will ever learn to draw. The conviction has been arrived at, from teaching many children, that a natural incapacity for apprehending forms, analogous to the total absence of an ear for music, does not exist. Some are surprisingly quick and clever; others, clever, but slow; the majority neither quick nor clever: but time and patience do wonders, even with those who appeared hopelessly incapable at first. And if any are unusually dull in the perception of form, the more their dormant faculties require training.

"As the master who is beginning to teach for the first time, and his pupils, will both be rather awkward at first, the former had better commence with his older pupils, as they will be easier to teach, and advance more rapidly than the younger ones. And both parties will manage better if he begin with a small preparatory class of not more than ten or twelve, for he should be able to examine each pupil's work at least twice, and, if possible, three times in the course of a lesson. When he has been somewhat used to teaching, he will be able to manage a class of twenty or twenty-five, but not more, unless he have an assistant; and he should always inspect each pupil's work himself, at least once each lesson.

"Pupils of all ages should begin with the most elementary stage, viz. white chalk-drawing on a board. The oldest pupils will soon get over this stage; and the master will then be better prepared to take on a second class for the first stage, while he is going through the second stage with his oldest class. One or more still younger classes may in time be added.

"The oldest pupils will be able to go on for three-quarters of an hour from the beginning, which, if convenient, may be increased to an hour. The youngest pupils, viz. from the age of seven to nine, had better be restricted to half-an-hour at first, and to three-quarters of an hour afterwards.

"When the master has had sufficient experience to enable him to begin a regular course of instruction throughout the school, he will find it a great convenience at the beginning of the half-year to draw up a list, in the following form, of the lessons that are to be given during the half-year, including the number, date, and subject of each lesson. If unforeseen causes of irregularity are liable to occur, the list can be made out first in pencil, and written in with ink as the lessons are given. Without this record it will be difficult to carry on a comprehensive course of drawing in a large school, or to recollect what has been done. If any of the youngest pupils should be thought unfit for the Inventive Exercises, they may draw from copies during that lesson. Nothing else is likely to be unfit for them.

"A good position, in sitting or standing to draw, is rarely attained by the beginner, without much attention. In sitting, many awkward and unhealthy postures are common among children; such as contracting the legs and keeping the feet up, which cause the weight of the body to press on the stomach or chest, especially on the left side; resting, or almost laying, the left side on the desk; bending down the head obliquely, so that the left cheek almost touches the paper; projecting the left arm upon the desk: all of which are incompatible with correctness and ease in drawing.

"The pupil should sit nearly upright, and give his body the necessary support and steadiness with the left arm.

"He should sit quite straight before the desk, and not bend his head to either side.

"His feet should rest firmly on the ground, rather inclined outwards, and somewhat apart.

"His desk or drawing-board should be inclined. It should not be so low as to require him to stoop, nor so high that he shall need to stretch upwards in drawing.

"The drawing should be placed quite straight, and exactly in front of him, and his drawing-copy kept exactly beyond it, and raised nearly upright. When room cannot be found for the copy in front, it must lie a little on his left. When objects are drawn, they should also be placed directly in front, and not very near to the pupil. Beginners are apt to raise up the right side of the drawing or slate, and keep them too far to the right.

"If the pupil stand, he should stand upright and quite straight, and keep both shoulders even, and equally distant from the board or slate. Beginners are very apt to stand with the left eye, shoulder and foot, close to the board, and the right eye, shoulder, and foot, away from it. This prevents them from drawing straight. Pupils who begin right are apt to flag and fall into the wrong position, if they are kept standing too long.

"The hand varies much in different persons. The swollen, horny hand of the artisan, and the thick, clumsy hands of children, are adverse to small fine work. Such work should, therefore, not be required at the beginning. The unsteadiness of children's hands also renders accuracy and cleanness of line impossible for some time.

"The white chalk should be held by beginners between the thumb and tip of the first and second fingers; and the hand kept steady by the ends of the other fingers, which should not be doubled up. A chalk holder should not be used by beginners, as it impedes them in drawing large free lines.

"The porte-crayon or pencil should be held between the thumb and front of the tip of the first and second fingers, all rather bent; and the hand should be supported by the two smaller fingers, neither of which should be bent on the palm. It should be held gently, so as to have the utmost freedom of motion, and farther from the point than a pen. Boys always hold the pencil too tight.

"Lines are most correctly drawn downwards, or from left to right, and should not be pushed upwards, or from right to left. The progress of the line should always be visible, while it is being drawn; and it must not be partially concealed by the hand. Generally the hand should be at right angles to the line it draws, except in drawing horizontal lines. Points should be made for the beginning and end of a line, before it is drawn.

"The success or failure of the teacher will in a great measure depend on his good or bad choice of drawing copies and models.

"Beginners of all ages have been noticed to tire of a subject very soon. If drawing-copies or objects be given to them which they do not understand, and cannot draw easily and rapidly, they lose spirit, are then sure to do no good, and are apt to acquire a fixed dislike to drawing. They will advance more quickly from chalking half-a-dozen simple outline subjects in one lesson, than from a single complicated piece. As they advance, they are able and willing to draw subjects demanding greater attention and time: still, the earlier drawings should be such as can be accomplished each in a single lesson. This point is rarely attended to sufficiently. Difficult drawings, if copied entirely by the pupil, are excessively ill done: he is heartily tired and ashamed of them, and learns nothing, or worse than nothing from them; if they are much corrected and finished up by the master (a most objectionable and immoral proceeding) the pupil's progress is not advanced.

"As far as possible let the pupil be a free agent. If he train in leading-strings, he will remain in leading-strings. Let him select for himself the drawing or model he prefers from a suitable stock: he will then work with more spirit, and feel bound in honour to do his best towards the object of his choice. If copies or models be always picked out for him, he runs the risk of becoming a listless machine. In other exercises, as in those of invention, let him invent what he likes within the limits of the peculiar exercise. He will then strive hard to realise his own conceptions, and the teacher will get at the real state of his capacity, his power and defects, to foster the one and correct the other.

"Before the lessons commence, the teacher should make a suitable collection of copies and objects, and place a number on each copy and on each object, in the order of their difficulty. Beginning with a class of 12, let him take out as many copies, viz. from No. 1 to No. 12. Let the first boy choose one, the next boy one from the 11 left, the third boy one from the 10 left, and so on, till the last boy takes the last copy. When a pupil has completed his drawing, let him exchange copies with another pupil. Let the same 12 copies be taken out for the second and following lessons, until the class have copied the whole of them. But in the second lesson let the lowest boy choose first, the lowest boy but one next, and so on, upwards.

"When copies Nos. 1 to 12 have been all drawn, let another portion, Nos. 13 to 24, be taken out and copied in the same manner.

"In drawing from objects (which is recommended in alternate lessons with copying), exactly the same course should be pursued, 12 objects being first picked out.

"The pupil should not begin to draw from a copy or model without previously examining it as a whole, then each part, and comparing the parts together. He should settle first by a dot where each main point should lie on his paper or board, and then begin to draw. But he should never make a line until he has determined where it should begin and end.

"He will often be greatly assisted by first dotting a perpendicular and a horizontal line through the middle of his paper or board, and observing where such lines would cross the parts of the copy or object. In drawing cups, bottles, houses, and other symmetrical objects, a perpendicular line is quite essential.

"Faults are often discovered in a sketch by turning it upside down, or sideways.

"All persons who have first learnt to write, draw perpendicular lines with an inclination to the right, that is, in the writing slant. Much pains are often required to conquer this habit. The pupil should compare his perpendicular line with the side of the board, holding his head back. Previous penmanship is also apt to give the habit of holding the pencil too near the point for a free command of it in drawing.

"A white chalk drawing should not be rubbed out until the teacher has seen it. If he do not come round immediately, the pupil should make a second copy (if he has not another drawing copy), and not sit idle.

"The black chalk should not be drawn over the charcoal sketch until the latter has been examined by the teacher. The charcoal lines should be drawn very faintly, or merely dotted. The chalk lines are then to be drawn lightly over the charcoal, and made thicker, where necessary, after the charcoal has been dusted off.

"The pupils should not hold the objects they draw from in their hands, but place them at some distance, straight before them, and settle and mark first the highest and lowest points of the intended drawing on the paper or board.

"Great accuracy cannot be expected, and should not be required from beginners. The endeavour to enforce it will irritate and tire out the pupil through fruitless attempts to attain it. At first the master will point out the glaring blunders only, being satisfied with a rude resemblance to the copy, and will require more exactness as the pupil advances; until, at last, minute errors will be noticed. It will be much more to the pupil's advantage if he can be led by the teacher to discover his faults, instead of being directly told of them.

"In making corrections and giving explanations, the teacher should beware of doing too much, and of going too far or too high, for his pupil. Too little is better than too much. Corrections suggested by the teacher, and made by the pupil, will show best how far the latter comprehends his faults and their cure. In cases where it is necessary that the teacher should himself draw the correction, he had better do it on a separate paper, or part of the paper, for the pupil to copy into the drawing.

"When the pupils draw on paper, they should write their names at the top of the paper to the right, and date it before they begin the drawing.

"When the lesson is over, the unfinished drawings should be collected by some responsible person, and placed in a portfolio, each one upon its respective drawing-copy, in order that they may be ready at once on the next occasion.

"When the drawings are finished, they should be put away by some responsible person, each pupil's into a separate sheet of strong paper, so that all the drawings of each pupil may be together in the order of date.

"A periodical examination of these drawings, before they are taken away from the school, would be useful and interesting to master and pupil.

"A list of the most suitable materials for elementary drawing, and their prices, is given in a succeeding paper. Some of the reasons for selecting these and omitting others are now given.

"The *Slate* and *Slate Pencil* are so convenient and cheap, and so universally employed, that it is to be regretted they cannot be recommended for Elementary Drawing. The lines made with them are harsh scratches, and almost force the beginner into a hard, petty, scratchy style; whereas if white chalk be used, either on a slate or board, a broad, bold style is almost inevitable, as fine lines cannot be made with white chalk. Drawing can also be performed very rapidly with it; more so, by the beginner, than with any other material, and it is very easily rubbed out.

"The *Lead Pencil*, though a beautiful and most convenient instrument, is unsuited to beginners, because small, mean drawing cannot be avoided, unless the pencil be a very soft, good drawing pencil, which is very dear, and wastes away very fast. Pencil drawing also requires more expensive paper than black chalk drawing.

"The *Black Conté Chalk* has the following recommendations. It is well suited for bold, broad lines and shading, if not cut to a very fine point. It can be used with coarse, cheap, coloured paper, on account of its great depth. Its first cost is small, including a cheap metal holder (in the absence of which it may be tied to a pen or a bit of stick). It lasts a long while, if not cut much, which need not be done for elementary drawing. Its disadvantages are—1st. It cannot be erased properly with India rubber, and therefore requires a previous charcoal outline, for the chalk will not lie on lines of lead pencil. 2nd. It smears, more easily perhaps than lead pencil. Cheap substitutes are noticed in the subsequent paper on materials.

"*Paper.*—Very thin paper is unfit for drawing of any kind; and drawing paper and good cartridge paper are expensive. Ordinary cartridge paper answers well, excepting that the thick black lines of beginners look harsh on it. Any common coloured paper, if not deep in colour or very thin, looks better in the early drawing, and is cheaper."

We do not think any masters who contemplate the introduction of drawing into their schools will meet with a plainer or more trustworthy guide, and we strongly recommend it to their notice.

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1. AN ELEMENTARY TREATISE ON THE DIFFERENTIAL AND INTEGRAL CALCULUS, FOR THE USE OF COLLEGES AND SCHOOLS. BY G. W. HEMMING, M.A., FELLOW OF ST. JOHN'S COLLEGE, CAMBRIDGE. SECOND EDITION, WITH CORRECTIONS AND ADDITIONS. (Cambridge: *Macmillan & Co.*)
2. THE ELEMENTS OF PLANE AND SPHERICAL TRIGONOMETRY; WITH THE CONSTRUCTION AND USE OF TABLES OF LOGARITHMS. BY J. C. SNOWBALL, M.A., FELLOW OF ST. JOHN'S COLLEGE, CAMBRIDGE. THE EIGHTH EDITION. (Cambridge: *Macmillan & Co.*)
3. ELEMENTARY HYDROSTATICS, WITH NUMEROUS EXAMPLES. BY J. B. PHEAR, M.A., FELLOW AND ASSISTANT TUTOR OF CLARE HALL, CAMBRIDGE. (Cambridge: *Macmillan & Co.*)

Two of these treatises are familiar to us, especially Mr. Snowball's Trigonometry, which has been in the hands of students several years, and has reached the eighth edition; but we shall notice separately, and in their order, the three works whose titles are here given.

1. In our number for November last*, we offered a few remarks on Mr. Todhunter's Treatise on the Differential and Integral Calculus, in which we entirely concurred with the author in respect to employing the method of limits, as the only true and legitimate way of establishing the first and fundamental principles of this most important science; and we observe, with much satisfaction, that in his elementary treatise on the same subject, Mr. Hemming adopts the same plan, and brings out the leading principles of the differential calculus with great clearness.

After explaining the necessity and use of the idea of a limit, Mr. Hemming conceives a perfectly clear notion of a limiting value of a function so important, that he illustrates and enforces the idea by geometrical considerations. The second chapter contains also investigations of the limiting values of such functions as

$$\frac{x^n - 1}{x - 1} \text{ when } x = 1\text{; and } (1 + x)^x,\ \frac{a^x - 1}{x} \text{ when } x = 0.$$

In the third chapter, which treats of the differentiation of functions of one variable, the author commences with certain preliminary explanations, one of which is:—

> "If dx and dy be any two quantities whose ratio is equal to the limiting ratio of the increments Δx, Δy, when these increments approach zero, so that
>
> $$\frac{dy}{dx} = \text{limiting value of } \frac{\Delta y}{\Delta x}\text{, when } \Delta x, \Delta y \text{ approach zero,}$$
>
> then dx and dy are called the differentials of x and y."

Having made other necessary explanations, Mr. Hemming proceeds to develop the fundamental principles of the science in conformity with the following definition:—

> "DEF.—When two variables x and y, connected by any equation, receive corresponding increments, any two quantities whose ratio equals the limiting ratio of these increments when they approach zero, are called the *differentials* of the variables; and the coefficient by which the differential of x must be multiplied to give that of y, is called *the differential coefficient of y with respect to x*; and its reciprocal, by which the differential of y must be multiplied to give that of x, is called *the differential coefficient of x with respect to y*."

These definitions of differentials and differential coefficients are in complete accordance with our own views, and we are glad that Mr. Hemming has made them the basis of his succeeding investigations. To explain yet more fully his notions with respect to differentials, he remarks, with great propriety, that

> "As differentials are defined merely by their ratio to one another, their *actual* magnitude is perfectly arbitrary; this, however, does not render an equation involving differentials indeterminate, since their *relative* magnitude is definite, and since from the nature of the definition it is impossible for a differential to

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* The second line of page 449, in the November number, is printed in an unintelligible manner. For the first two expressions in the second line, read $\int x^m dx$, $\int \text{in } x\, dx$.

appear as a factor on one side of an equation, without another connected with it appearing on the other."

This is precisely the view we take of differentials, and when such an expression as $x^m\,dx$ presents itself, the differential of some dependent variable as dy is always implied, and the equation

$$dy = x^m\,dx, \text{ or } \frac{dy}{dx} = x^m,$$

is understood to be the equation under consideration. Since, then, the actual magnitude of differentials is perfectly arbitrary, their relative magnitude only being fixed, how preposterous to assert, as several writers of considerable eminence have done, that the magnitudes of the differentials of quantities, as dx and dy, are *absolutely zero!* No such thing; they are not even *indefinitely small*, according to Mr. Hemming's views, though some authors represent them as such, for it is not their actual, but their relative magnitudes that we have to deal with. Whether the differential, or the differential coefficient notation be employed, they express the same fact, namely, that the ratio $\frac{dy}{dx}$ is equal to a certain function, and therefore both may be used, to a certain extent, with equal convenience.

Having so fully explained both methods of notation, Mr. Hemming finds no difficulty in introducing, thus early, the common processes of integration, and the whole of the fourth chapter is devoted to the integral calculus. It was the practice of the earlier writers to intersperse the integral with the differential calculus, that by so doing they might be enabled to apply the principles they had established to several useful and important practical inquiries. We think the plan of combining both divisions of the calculus is, to a certain extent, very judicious, as several useful integrals are at once obtained by simply reversing the results of the differentiation of certain functions. This chapter contains much valuable and instructive matter, embracing the usual methods employed for finding the integral equation from which a proposed differential equation has been derived.

In succeeding chapters, the author treats, in a very perspicuous and elegant manner, on successive differentiation, and the development of functions, as well as the maxima and minima values of functions—tangents and asymptotes—contact of curves—singular points, and tracing of curves—envelopes—differentials of areas, &c.—and integration between limits, concluding the volume with successive integration, or multiple integrals.

As a *theoretical* treatise on the differential and integral calculus, Mr. Hemming's work merits our highest commendation, but it lacks examples, and every one knows the value of practical illustration of recondite principles. In the preface to the second edition, it is stated that "additional illustrative examples are given, but for purposes of practice the student is still referred to Gregory's Collection of Examples." We know the great value of the collection of examples referred to, but every student has not the means to procure expensive books, and we are of opinion that every elementary work on any branch of science should contain within itself a number of well-selected examples sufficient to illustrate the different subjects brought under the notice of the student. The insertion of an adequate number of useful examples would neither greatly increase the size of the volume, nor yet much enhance its price; and were the excellent theoretical discussions with which the work is enriched, illustrated by choice examples, Mr. Hemming's treatise would certainly be among the best we possess. As it is, the work is an excellent elementary one; the leading principles of both divisions of the calculus are developed in a clear and perspicuous manner, and the higher researches abundantly evince the usual acuteness of the author. The plan and execution of the work are alike meritorious, and we hope many editions are yet in store of so valuable and useful a work.

2. Mr. Snowball's Treatise on Plane and Spherical Trigonometry has been many years before the public, and in some of the leading educational institutions in this country it has been used as a text-book. A work which has been so favourably received, and which has maintained its position of pre-eminence so long as to have "the eighth edition" stamped on its front, requires none of our commendation. It now appears in a more commodious form—its price has been reduced—the original design of the work has been kept in view—and upwards of two hundred examples, taken principally from the questions set of late years in the public examinations of the university and of individual colleges, have been added to the former excellent collection of examples and problems for practice. All these are undoubted improvements, and had the author departed somewhat from his original design, and substituted line-definitions instead of ratio-definitions, he would have added greatly to the reputation of his really useful and valuable treatise. The line-definitions speak more than ratio-definitions to the eye and the understanding of the student, and they are, moreover, far more in accordance with geometrical reasoning. Taking a particular circle, namely, that whose radius is the linear unit, it is pleasing and instructive to learn how arcs and their corresponding angles can be measured by means of certain straight lines drawn in and about the circle, and which are termed the trigonometrical functions of an arc. How simple it is to trace the mutations of these trigonometrical functions, both as regards their magnitude and their algebraic sign, while the arc varies from zero to a complete circumference! The ratio-definitions are consequences of the other definitions, and whatever admits of proof should be deduced from definitions to which no reasoning can be applied. We trust the time is not distant when these ratio-definitions of trigonometrical functions will be utterly discarded, and the more natural and scientific method of line-definitions made the foundation of every treatise on trigonometry. Let them occupy their proper place, and they will be found exceedingly useful in the practice of trigonometry and the solution of triangles; but they should never supersede simpler and more elementary geometrical definitions.

Unnecessary contractions of terms of frequent occurrence should also be avoided as much as possible, and the great progress which the science of trigonometry has recently made is entirely owing to the introduction of a suitable and self-interpreting notation.

In former times a single initial letter was made use of to signify sine, cosine, tangent, &c.; but the introduction of the contractions *sin.*, *cos.*, *tan.*, &c., for these terms gave an unprecedented impulse to the science of trigonometry, and added unusual clearness to its processes. In the practice of this useful science the term "logarithm" is also of frequent occurrence, and the contraction *log.* is now almost universally adopted to signify logarithm. Mr. Snowball uses the single initial letter very frequently instead of log.; but we think the three-letter contraction far preferable, and much more elegant, in any trigonometrical equation. The contraction *colog.* for "complement of the logarithm" should also be universally adopted.

In the solution of a right-angled spherical triangle, Mr. Snowball, at p. 185, Art. 40, explains very clearly the ambiguous case, showing that it exists only when an angle and the side opposite to it are the given quantities. In the succeeding article (41), the author gives the two following principles for the guidance of the student in the solutions of the other cases of a right-angled triangle, and illustrates them by an example:—

(1) The greater side is opposite to the greater angle;
(2) An angle and the side opposite to it are of the like affection.

Instead of adverting to these principles, we have frequently made use of the following method in these cases, and have found it very useful in rendering the subject intelligible to the student.

Let, for example, A B C be a right-angled spherical triangle (C being the right angle), and let the two angles A and B be given, to find the side c opposite to the angle C.

By Napier's rules, we have $\cos c = \cot A \cot B$, and if either A or B be greater than a right angle (A, for example); then $\pi - A$ will be less than a right angle; but $\cot(\pi - A) = -\cot A$, or $\cot A = -\cot(\pi - A)$, and the equation becomes

$$\cos c = -\cot(\pi - A)\cot B, \text{ or } -\cos c = \cot(\pi - A)\cot B.$$

Now, since $\cos(\pi - c) = -\cos c$; we have manifestly

$$\cos(\pi - c) = \cot(\pi - A)\cot B;$$

and since $\pi - c$ is less than a right angle; therefore the side c is, in this case, greater than a right angle. Thus, a recurrence to first principles will, in all cases, determine whether the arc or angle is greater or less than 90 degrees.

Mr. Snowball's work abounds with choice examples for practice, and much valuable information is interspersed throughout the volume. The investigations are remarkably neat, and the main principles of trigonometry are presented in a very clear and intelligible form.

3. As an elementary work on hydrostatics, Mr. Phear's book will be found a very useful one, and those who desire to extend their knowledge of this subject may profitably consult the valuable treatises of Miller, Moseley, and Webster. It is a convenient volume of 139 pages, divided into five sections, and illustrated with a variety of woodcuts. The definitions and explanations in the first section are very clear, and the experimental illustration that the principle that "a force applied to the surface of a fluid at rest is transmitted, unchanged in intensity, in all directions through the fluid," is exceedingly interesting. The second section embraces *inelastic fluids;* the third, *elastic fluids;* and in these the usual hydrostatic instruments, and the various kinds of pumps and engines, are described in a popular and intelligible manner. In the fourth section, consisting of *general propositions*, several very excellent investigations are introduced, and we do not recollect of having seen a simpler demonstration of the following proposition than that which occurs at pp. 86, 87:—

> "The surface of a heavy fluid contained in a vessel, which revolves with a uniform angular velocity about a fixed vertical axis, is a paraboloid."

The fifth and concluding section contains much interesting matter relative to the *mixture of gases*, and to *vapour*; but to convey any idea of the instructive experiments, and the explanations of meteorological phenomena, with which this part of the work abounds, would require so many extracts that we must refer the reader to the work itself, where he will be gratified in perusing the explanations of various natural phenomena.

Mr. Phear's Elementary Hydrostatics is an excellent introductory book. The descriptions and explanations are sufficiently full and intelligible; the investigations are simple and scientific; and the examples appended to each of the four last sections greatly enhance the value of this unpretending little volume.

CORNELIUS TACITUS, EXPLAINED BY DR. KARL NIPPERDEY. TRANSLATED FROM THE GERMAN BY REV. H. BROWNE, M.A.

The want of an edition of the more important and longer portions of the writings of Tacitus, in a form adapted to the use of the younger student, has often, we are inclined to think, been felt by those who have been much engaged in the tuition of the higher forms in our large schools. For the riper scholar, the editions of the various learned Germans who have taken this work in hand supply all that is needed. Ritter, (though his notes are too few, and often we think deficient in clearness, leaving on the mind an impression that the passage on which we have referred to him for information has not been lucidly explained,) Ruperti, and Walther leave nothing to be required—but these are more adapted to the advanced student; for the younger reader there was no suitable edition, with judicious English notes: indeed this author appears to us to present unusual difficulties to the annotator. It is not enough here to explain the difficulties in phraseology or construction, it is very easy in Tacitus to understand both the one and the other of these, and utterly fail to comprehend the passage in hand adequately. The argument frequently requires expanding, and the gist of it forcibly pointing out, to enable the boy fully to master the writer's aim. This may easily degenerate into prolixity and unnecessary verbiage; but Dr. Nipperdey appears to have generally observed a judicious mean between saying too much or too little. To test the value of the notes, we turned to an extremely obscure passage on the subject of the abuses arising from the system of usury prevalent at Rome, a passage well known to every scholar as presenting great difficulties. We allude to the 16th and 17th chapters in the 6th book. On these two perplexed chapters the annotations are more satisfactory, except in one or two instances to which we shall presently recur. Without translating entire sentences, by judicious and brief explanations as to the general meaning of the more difficult expressions, the student, without undue help, and if he choose to exert to some extent his own ingenuity, will be able to gather a fair idea of the meaning of these two chapters, a clearer one we venture to assert than he would do by the use of any school edition of Tacitus he ever saw. Perhaps, if there be a fault in the notes, it lies in the too extended adoption of the method we have alluded to above, of explaining the general meaning of a passage without disclosing the exact signification of the phrase in question. We notice in several places this done where we are inclined to think an exact translation would have been useful. For instance, on book 6, chap. 2, we have "*tanquam referret*—Tiberius dealing as arbitrarily with the *cerarium* as with the *fiscus*." Now this note would scarcely guide the learner to the meaning of the phrase "*tanquam referret*," a phrase we never yet knew to be rightly construed by a boy. We have noticed several instances of the sort; but it is, after all, extremely difficult to fix where to *explain* and where to give a literal rendering, so that there will generally be a different opinion held by different minds as to the propriety of the one or the other method in particular instances. We are rather surprised that the old interpretation of the famous phrase "*fenus unciarum*" is adhered to. Interest at one per cent. per annum could never have been represented as so grievous a burden to the debt-laden plebeian as we know it to have been. Nor, again, do we consider "*versura*" to be, as here represented, simply "lending upon interest;" but rather borrowing money to pay the interest on a previous loan. However, we cordially approve of the book, and recommend it heartily as far superior to any edition hitherto published for the use of schools.

C. JULII CAESARIS COMMENTARII DE BELLO GALLICO. WITH NOTES BY GEORGE LONG. (London: *Whittaker and Co.*)

In this most satisfactory edition will be found a careful and judicious text, full and clear explanations and translations of difficult passages, and a store of geographical, historical, and political information. It contains an Introduction upon the physical character of the vast region over which Caesar's military operations ranged, which should be read carefully, with the help of good maps, by every teacher or student who desires to comprehend his author. There are also Notes upon the questions of time and place occurring in the British expeditions; upon Aduataca, where the weakness of Sabinus brought upon the Roman arms a disaster similar to our own at Cabul; upon Gergovia, where Caesar was defeated; and Alesia, the scene of his conquest of Vercingetorix.

Perhaps, as one of a series of Grammar School Classics, the greatest merit of the book is the distinctness with which it treats some of the principal difficulties that arise in a grammatical study of the Latin language. The many passages where the MSS. of Caesar vary between the indicative and subjunctive moods will, if attentively considered under the guidance of the editor, leave the learner in possession of much clearer ideas upon this point; and those persons who have striven to attain the same result by the help of notes partly in Latin, of which they understood little, and partly in German, of which they knew nothing, will not fail to appreciate the aid here afforded them. For remarks valuable to those who desire to write correct Latin, we may instance the distinction between "vel" and "aut," p. 55; the note on "biduum supererat quum," p. 58; "resciit," p. 63; "quin" or infinitive after "dubito," p. 97. The difference between "declivis" and "adclivis," p. 113; "concilium" and "consilium," p. 133; "deferre" and "referre," p. 153; and "instituo" and "constituo," p. 265, are well stated. There is the best explanation we have seen of "ultro" and of "non modo," at p. 138. "Veneti . . . : . certiores facti," &c. is a good note upon a hard passage. The famous bridge over the Rhine, in Book IV., and the military works in Book VII., are amply and ably treated.

Of legal and other antiquarian learning the notes on "vectigalia," p. 53; "jus belli," p. 71; "testamenta," p. 75; "ordinum," p. 76; and "ei . . . . . accepta referebat," p. 412, are examples showing complete mastery of the subject; and here it is needless to mention that no authority is higher than Mr. Long's. As a caution to careless readers, or those who find Caesar easy, and therefore, to borrow the editor's words in writing of another author, "are not persons who are much alive to the perception of difficulties," we advise reference to the note upon "fit initium," p. 137; and "sua.... timidiores," p. 154. Much is done both to point out difficulties, and, where possible, to remove them; and it may be doubted which is the greater service to the correct study of the classics.

Upon the topographical controversies perhaps Mr. Long is on less familiar ground; and we cannot expect to see questions so much vexed, quieted by a single effort: but he is entitled to high praise for keen perception and apt employment of all collateral lights, and for assiduous truth-seeking investigation; and he has done much to prepare the way, as he says, or an edition of Caesar that shall be worthy of him. We must say, too, that many of the conclusions have a strongly probable appearance.

It may be worth while to give further publicity to Mr. Long's suggestion, tnat some of the many Englishmen who go abroad every year might amuse themselves with examining the ground of Caesar's operations, where they require further investigation. But it is no easy matter to find united the various sorts of knowledge requisite for the illustration of an ancient historian. Some of the most learned Continental critics show themselves lamentably deficient in geographical and other ordinary information, and are found expounding what was clear to every one but themselves, at least until they wrote; while in England we have seen sometimes a disposition to rely upon travel, and the talent for observation, at home and abroad, as a substitute for that thorough scientific familiarity with the author's language in which the editor felt himself to be unsound. We think that the present work has been produced by a harmonious blending of these various qualifications.

It may possibly be thought that where space is limited, and is generally so well used, rather too much has been devoted to exposing certain blunders of previous learned editors; and that we may regret the loss of even a single line of valuable observation in its place. We must say, however, that there is great freshness and vigour about these remarks, and that we have read with pleasure every sentence that Mr. Long has written; and we think that the masculine style of the preface is worthy of a writer who comes newly from the study of Caesar, and has Caesar for his subject, and is not the weakest proof of the editor's proposition, "that Caesar's Commentarii are worth reading."

OUTLINES OF SCRIPTURE GEOGRAPHY AND HISTORY, ILLUSTRATING THE HISTORICAL PORTIONS OF THE OLD AND NEW TESTAMENTS. BY EDWARD HUGHES, F.R.A.S., &C., HEAD MASTER OF THE ROYAL NAVAL LOWER SCHOOL, GREENWICH HOSPITAL. (London: *Longman & Co.*)

THIS volume is designed for the use of schools and private reading, and seems to us to provide a volume which, though not specially called for, will be found exceedingly useful. It is a careful compilation by an experienced teacher, and embodies the results of the researches of the modern travellers, wherever they throw light upon the Scriptures. It will be found a very useful compendium for Bible students, masters, pupil teachers, the upper classes of schools, and an interesting volume for private reading. It contains twelve coloured maps, which are very neatly and clearly engraved.

THE HISTORY OF ENGLISH LITERATURE. BY PROFESSOR SPALDING, 1852. (Edinburgh: *Oliver and Boyd.*)

This work gives the results of the critical inquiries that have of late years been instituted, into the origin and affinities of our tongue. Professor Spalding evidently brings a vigorous and well stored mind to the task that he set himself in composing the History of English Literature. His critical judgments are seldom original in the sense usually attached to the term, but they are certainly his own after having listened to the opinions of others. It is a work, however, from which the student will derive much information. It is fuller than the works on the same subject by Chambers and Craik; and it is, in one respect, more serviceable than Shaw's admirable Outlines; for Professor Spalding gives extracts from the various authors that he passes under review; as we come down to modern times these extracts are not very long or very valuable; but this was unavoidable if the work was to be kept within a moderate compass.

ELEMENTARY SCHOOL ATLAS OF GENERAL AND DESCRIPTIVE GEOGRAPHY. BY A. K. JOHNSTON. 4to. (Edinburgh: *Blackwood & Sons.*)

GEOGRAPHICAL PROJECTIONS, TO ACCOMPANY KEITH JOHNSTON'S ATLASES OF PHYSICAL AND GENERAL SCHOOL GEOGRAPHY. (Edinburgh: *Blackwood & Sons.*)

The first of these is a new atlas, reduced apparently from the larger school atlas, lately issued by Mr. Johnston, and adapted for younger classes by the omission of the less important names. Like its predecessor, it is printed in colours, and is beautifully clear and distinct, and has a full index. It is the best atlas we have seen at the price at which it is published.

The projections are intended to afford means of drawing maps, at a more moderate price than has been practicable upon maps printed from copper plates.

The projections are laid down upon a rough black board, stout paper, or cardboard, and the surface being roughly varnished, a map may be drawn upon it in white or coloured chalks, as often as may be requisite; the drawing being easily erased with a damp sponge.

This method of teaching was originally introduced into the High School at Edinburgh, by Professor Pillans, and is described in his excellent volume (The Rationale of Discipline), to which we lately drew attention. The plan is a good one for grammar or middle schools, but not applicable to simultaneous teaching of large numbers.

The "projections" are well adapted for the purpose.

Correspondence.

ON WRITING.

Sir,—Writing is now so universally recognized as one of the first things to be taught in any system of education, that no apology need be offered for directing the attention of your readers to a consideration of the present state of this art, and the best methods of teaching it. At the same time I shall endeavour to offer a few suggestions which may be of service to teachers, and point out what I deem to be the advantages and deficiencies of those numerous appliances in the form of copy-books which have obtained such an extensive circulation in our schools.

Although good handwriting is considered indispensable in these days of progress, it must be remembered that twenty years ago many of our large grammar schools afforded no instruction in this art to their numerous pupils, who were accordingly left to pick up an acquaintance with their native written characters in the best manner they could; and I doubt not that most of your readers have, at one time or other, experienced annoyance when unable to decipher the illegible scrawl of some highly educated man. If it is allowed that the writing of the higher and educated classes is sometimes deficient in clearness and elegance, it will, we think, be still more readily conceded that this part of education has been grievously neglected among our poorer population, many being totally unacquainted with the very elements of writing. A single extract from the bulky volumes of the Educational Committee of the House of Commons will show the lamentable extent of this ignorance. In the Registry of Marriages for 1839 it is stated, that "the average proportion per cent. of those who, from inability to write, signed their names by marks was thirty-three per cent. of the men, and forty-nine per cent. of the women! Out of 121,083 couples married, there were 40,587 men, and 58,959 women, who could not sign their names!!"

It is not my intention in the present paper to enlarge upon the manifest evils of this ignorance, or to speculate upon the possibility of devising some system of cure, for I believe that every year is gradually lessening this proportion, and that such a state of things will shortly pass away; but I shall devote my attention more particularly to the character and style of writing encouraged in our schools and colleges. Various indeed are the rules laid down by different teachers of the art of penmanship; and great praise will be due to that master who shall evolve from these diversified rules such a system as shall be considered worthy of universal adoption.

If it be expedient to introduce writing into the school-room as a branch of education, it is equally desirable that it should be *well* taught. One great cause of the prevalence of bad writing is the inefficiency of those selected to give instruction. Until excellence is insisted upon as an indispensable qualification for a tutor, all improvement is hopeless. Pupils will invariably acquire the defects of their teachers; and every experienced master knows how difficult it is to eradicate the faults and errors which have been countenanced for a long period under an inefficient instructor.

That skill in penmanship was cultivated with greater assiduity in the seventeenth and eighteenth centuries than it is in the present, is manifest to any one who has carefully studied the numerous caligraphic specimens bequeathed to us by those who attained to any degree of excellence. They are highly to be praised for their neatness and regularity, but are deficient in that elegance and finish which is the chief characteristic of more recent penmen. George Bickham, an eminent engraver of the early part of the last century, published a work, entitled the "Universal Penman," wherein specimens of the best writings of masters living in that and the preceding age are exhibited. The writing is exceedingly well done, the distance between the letters well preserved, the height and length of the looped letters very generally maintained; but, being the labour chiefly of *ornamental* penmen, there is a quaintness of character, and grotesque imitation of animals, which becomes at times highly ludicrous. Yet faulty as it is in many essential points, the style of writing challenges competition with our modern copies for what is called, by one of the old masters, "Inclination, heighth, breadth, bigness, and continuation," of character.

In 1763 another work was published, illustrative of the high estimation in which the art of caligraphy was held. The work is curious, as well for its matter as its rarity, and is entitled "The Origin and Progress of Letters," by W. Massey, who was an enthusiastic lover of the art. In it biographical notices of nearly eighty writing masters are detailed, most of whom had given to the world some proof of their talent through the medium of the "rolling press." These notices are interspersed with various amusing anecdotes relative to caligraphic performances, showing how, in 1595, one Peter Bales contended with a contemporary, Daniel Johnson, for a golden pen of twenty pounds value; how, a century later, the Standard Rules, published by Mr. Snell, proved the cause of an acrimonious controversy among the scholastic fraternity. The book contains allusions to Standard Rules, issued by different writing masters for the space of two centuries, but wisely adds, "Who now-a-days take those Standard Rules, either one or the other, for their guide in writing?" Each by turn, in the natural course of events, has become almost obsolete.

The two most accomplished penmen of the present century are Mr. Tomkins and Mr. Paton. The former has published several caligraphic works, which are highly esteemed by practical teachers; and the latter, in his Beauties of Penmanship, has raised his art, if possible, to a still further state of perfection. The works of these penmen deserve a closer imitation by the designers of our copy-books. Mr. R. F. Clarke, another superior writer, has issued a set of copies which are worthy of imitation. In the works of these writers will be found the principles which should guide the student.

Where an efficient master is employed, and individual instruction is given, the plain ruled copy-books are the best. The master can then adapt his mode of teaching to the requirements of the scholar; he can devote attention to his peculiar deficiencies, or assist his progress where natural aptitude is perceptible. But when he has to convey instruction to many pupils at the same time, additional aids are required; and these are found in the use of the *large black board* and *interlinear copy-books*. The former is indispensable in large schools: by it the teacher is enabled to display, in plain character, the peculiar construction of the more difficult letters; the height, width, and inclination of the strokes; the form of the capitals and figures, &c. If this is done with judgment, it will be found a most expeditious method of imparting instruction, and will seldom fail to insure success. The assistance to be derived from the interlinear copy-books depends entirely upon the manner in which they are drawn up. If the copies are irregular, the form of the letter incorrect, the style of writing inelegant, these defects will be copied with more or less accuracy by the pupils: the faults and peculiarities of the examples will be as readily acquired as the beauties. It is for this reason that I desire to devote a larger share of our attention to these copy-books than the subject would at first sight appear to warrant, feeling convinced that the tardy improvement visible in many schools is attributable to the bad style of writing encouraged by the copies.

To render an interlinear copy-book serviceable it must be designed with great care and skill, the copies should be short and not occur too frequently, never more than twice in a page of eight lines; they should be ruled down between the words, the pupil being by this means restrained within the limits in which the copy is written; the letters should be simple, void of all flourishes, otherwise the learner will run into excesses which are licensed by no standard rules. Great regard must be paid to the proper width of letters, to the height or length of those which rise or descend from the lines.

As many of these books have fallen under my observation, and I have practically tested their worth, I may be allowed to express an opinion with regard to their merits and demerits. The first upon which I have to remark, is the Manual of Writing, published (under the sanction of the Committee of Council on Education) on the Swiss system of M. Mulhauser; it contains many excellent rules and precepts; but a few alterations might be made which would materially increase its usefulness; there is a stiffness about the examples, which an increase of inclination would tend in a great measure to remove; the distance between the *o* and the succeeding letter is incorrect, unless when followed by a curved stroke as *e*, or *a*; the same may be remarked of the space between the *w* and succeeding letter; the cross to *f* is too fanciful; the capital letters, such as *A*, would be better commenced with dots,—simplicity of form being a great recommendation in copies; *W* and *V* might be improved; still I cannot but approve the labour bestowed upon the book, and regret that it should be necessary to qualify my commendation in any degree.

"The short and certain road to a good handwriting, by Mr. George Darnell," would, in our humble opinion, be traversed with greater facility, and with happier effect, were a little more attention directed to the works of Mr. Tomkins and Mr. Paton; the capital letters are badly designed, and sadly unsuited for copies: the figures are worse; throughout the earlier part of the series, the pupil is led to depend too much upon the copy, one line being insufficient practice after the pupil has traced it; these books possess one advantage, they are ruled down between the words.

The remarks applied to the Manual of Writing, recommended by the Committee of Council on Education, may with equal truth be applied to the copy-books of Mr. Walter M'Leod; the style of writing is better, but the same error exists respecting the distance to be preserved between the o and succeeding letter; some of the capital letters might be improved, the down stroke of the *Z*, for instance, is never made thick by a good penman.

Foster's copy-books have many advantages, and perhaps contain fewer errors, but the writing is deficient in that freedom which it is very desirable that a child should acquire early, it being much easier to train the hand at first, than to remove negligent habits when once formed; the figures are perhaps the worst part of the book; in the earlier numbers of the series, the learner is (as in Mr. George Darnell's series) made too dependent upon the copy.

Messrs. Chambers have issued, among their numerous educational publications, a series of copy-books; but they encourage a loose style of writing, and the letters are in many instances formed without any regard to standard rules.

There are several other elementary works on Writing, as Rapier's "First Book," Scott's Copy-books, &c. To these I may return on another occasion. I need scarcely observe, that I hold in no estimation the puffing assertions of those who promise their credulous readers a "good handwriting in a few easy lessons." Writing is an art that can be acquired only by continual practice; and it is just as probable that a person will become a proficient in the Greek language by a few hours' study, as that he will obtain from these advertisers the advantages they promise.

I may seem to have passed too severe a censure upon some of the books to which I have alluded, and to have abstained from praising where praise was due; but whoever has observed the efforts made by writing masters of a former age, and studied the caligraphic performances they have left us, must see that improvement in this department is not commensurate with the advancement made in other branches of education. I am well aware that in many schools very great attention is directed to penmanship, and that a corresponding improvement is the result. I may instance Christ's Hospital; and those of your readers who are desirous of seeing the perfection acquired in this art, even in early youth, would do well to pay a visit to the half-yearly exhibitions of penmanship, in the Great Hall of the Hospital, in the months of May and November. To those who pursue this art as a profession, I cannot do better than recommend an attentive study of the beautiful specimens of Chirography, by Mr. Paton, that adorn the walls of the Chamberlain's Office at Guildhall. N.

ANSWERS TO THE MATHEMATICAL QUESTIONS.

QUES. 159.—*Proposed by Amicus.*

$$\left.\begin{array}{l} \text{Given } x - y = 2 \;.\;\;.\;\;.\;\;. \;(1) \\ \text{and } (x^2+y^2)(x^3-y^3) = 260 \;(2) \end{array}\right\} \text{ to find } x \text{ and } y.$$

Answered by E', Mr. John Godward, Mr. K. Carlisle, Mr. W. H. Levy, Mr. Samuel Dyer, and Mr. John Salter, Durham.

Dividing (2) by (1) $(x^2+y^2)(x^2+xy+y^2) = 130 \;.\;.\;.\;.\;.\;. \;(3)$

Squaring (1) and trans. $x^2+y^2 = 4 + 2\,xy.$

Substituting this value of x^2+y^2 in (3), we have

$$(4 + 2\,xy)(4 + 3\,xy) = 130,$$

which reduces to $3\,x^2y^2 + 10\,xy = 57$,

and this solved gives $xy = 3$ or $-\frac{19}{3}$.

Adding $4\,xy$ to the square of (1),

$$x^2 + 2\,xy + y^2 = 16 \text{ or } \tfrac{64}{9}(-3)$$

$$\therefore x + y = \pm 4 \text{ or } \pm \tfrac{8}{3}\sqrt{-3};$$

but $x - y = 2$,

$$\therefore x = 3 \text{ or } -1 \text{ or } 1 \pm \tfrac{4}{3}\sqrt{-3},$$

$$\text{and } y = 1 \text{ or } -3 \text{ or } -1 \pm \tfrac{4}{3}\sqrt{-3}.$$

Second Solution, by Messrs. Brookes, Mansford, and Ritter.

Let $x = u + 1$ and $y = u - 1$, then the first equation is satisfied, and the second becomes $(2u^2+2)(6u^2+2) = 260$, which reduces to $3u^4 + 4u^2 = 64$; and this solved gives $u = \pm 2$ or $\pm \frac{4}{3}\sqrt{-3}$;

$$\therefore x = u + 1 = 3 \text{ or } -1 \text{ or } 1 \pm \tfrac{4}{3}\sqrt{-3},$$
$$\text{and } y = u - 1 = 7 \text{ or } -3 \text{ or } -1 \pm \tfrac{4}{3}\sqrt{-3}.$$

QUES. 160.—*Proposed by Mr. John Thompson, London.*

Prove the truth of the formula—

$$\cos^3\theta\,\frac{\sin 3\theta}{3} + \sin^3\theta\,\frac{\cos 3\theta}{3} = \frac{\sin 4\theta}{4}.$$

Answered by Messrs. John Godward and T. T. Wilkinson, and on similar principles by Mr. Mansford, Mr. Ritter, E′, and A. M.

$$\cos^3\theta\,\frac{\sin 3\theta}{3} + \sin^3\theta\,\frac{\cos 3\theta}{3} = \cos^3\theta\,(\sin\theta - \tfrac{4}{3}\sin^3\theta) + \sin^3\theta\,\tfrac{4}{3}(\cos^3\theta - \cos\theta)$$
$$= \cos^3\theta\sin\theta - \sin^3\theta\cos\theta = \cos\theta\sin\theta\,(\cos^2\theta - \sin^2\theta) = \tfrac{1}{2}\sin 2\theta\cos 2\theta$$
$$= \frac{\sin 4\theta}{4}.$$

Second Solution, by Mr. John Brookes, and Mr. William Godward, jun.

$$\frac{\sin 4\theta}{4} = \frac{\sin(3\theta+\theta)}{4} = \frac{\sin 3\theta\cos\theta + \cos 3\theta\sin\theta}{4}$$
$$= \frac{\sin 3\theta}{4}\left(\frac{4\cos^3\theta - \cos 3\theta}{3}\right) + \frac{\cos 3\theta}{4}\left(\frac{4\sin^3\theta + \sin 3\theta}{3}\right)$$
$$= \cos^3\theta\,\frac{\sin 3\theta}{3} + \sin^3\theta\,\frac{\cos 3\theta}{3}$$

QUES. 161.—*Proposed by Mr. Thomas Ambler, Wakefield.*

In a given paraboloid of revolution it is required to inscribe the greatest cylinder.

Answered by Mr. William Godward, jun., Mr. Wm. Righton, Mr. W. H. Levy, E′, and A. M.

Let a = radius of the base of the given paraboloid, and b = its altitude; also x = altitude of the cylinder, and y the radius of its base; then, by a property of the parabola, $b : b - x :: a^2 : y^2$; $\therefore y^2 = \frac{a^2}{b}(b - x)$; hence the content of the cylinder $= \pi y^2 x = \frac{\pi a^2}{b}(bx - x^2)$, which is to be a *maximum*; or $u = bx - x^2$, a *max.*; $\therefore \frac{du}{dx} = b - 2x = 0$; or $x = \frac{1}{2}b$; that is, the height of the greatest cylinder is half the height of the paraboloid.

QUES. 162.—*Proposed by Mr. W. H. Levy, Shalbourne.*

Let the sides of any triangle ABC be bisected in the points D, E, F; then the centre of the circle inscribed in the triangle DEF is the centre of gravity of the perimeter of the triangle ABC.

Answered by the Proposer and Mr. Wilkinson, and similarly by Mr. Wm. Godward, jun., and Mr. Wm. Righton.

Let D, E, F be the middle points or centres of gravity of AB, BC, CA. Divide EF in P so that EP : PF :: AC : BC; then P is the centre of gravity of the sides AC, BC; but D is the centre of gravity of AB; therefore if DP be joined, the centre of gravity of the perimeter of the triangle will be in DP. Again, since DE = $\frac{1}{2}$AC, and DF = $\frac{1}{2}$BC, we have EP : PF :: DE : DF, therefore DP bisects the angle EDF; that is, the centre of gravity of the perimeter of the triangle is in the line which bisects the angle EDF. In the same manner it may be shown to be in the lines which bisect the angles DEF, EFD; but the lines which bisect the angles of the triangle DEF intersect in the centre of its inscribed circle. Wherefore the centre of the circle inscribed in the triangle DEF is the centre of gravity of the perimeter of the triangle ABC.

LIST OF MATHEMATICAL ANSWERS.

John Brookes, Manchester, ans. 159, 160; Kerslake Carlisle, ans. 159; Samuel Dyer, Wanstead, ans. 159, 160, 161; E′, Great Stukeley, ans. 159, 160, 161, 162; John Godward, Chelsea, ans. 159, 160; William Godward, jun., Chelsea, ans. 159, 160, 161, 162; W. H. Levy, Shalbourne, ans. 159, 160, 161, 162; Charles Mansford, Westminster, ans. 159, 160; A.M., ans. 160, 161; William Righton, Ripley, ans. 160, 161; Edward Ritter, Sunderland, ans. 159, 160, 161, 162; John Salter, Durham, ans. 159; and T. T. Wilkinson, Burnley, ans. 160, 162.

NEW QUESTIONS,

To be answered in our Number for April, 1853.

Ques. 163.—*Proposed by Mr. T. T. Wilkinson, Burnley.*

A gentleman in Burnley has recently purchased a number of ground-rents, producing 76*l.* per annum, and having forty-three years to run, for 1200*l.* What rate of interest does he obtain for his money?

Ques. 164.—*From Pott's School Euclid, communicated by a Correspondent.*

"In the base BC of an isosceles triangle ABC, take a point D, and in CA take CE equal to CD, let ED produced meet AB produced in F; then $3\angle$ AEF = 2 right angles + $\angle$AFE, or = 4 right angles + $\angle$AFE," according as the vertical angle is greater or less than two-thirds of a right angle. Required demonstrations of both cases.

Ques. 165.—*From the Senate House Problems for* 1852, *proposed by request of a Correspondent.*

Prove the truth of the formula—

$$2\,(\sin^6\theta + \cos^6\theta) - 3\,(\sin^4\theta + \cos^4\theta) + 1 = 0.$$

Ques. 166.—*From the same, communicated by Mr. W. H. Levy.*

A uniform rod of length l is cut into three portions, a, b, c, and these are formed into a triangle; when the triangle is placed in unstable equilibrium, resting with its plane vertical, and one of its angular points upon a smooth horizontal plane, find the angle which the uppermost side makes with the horizon; and show that if α, β, γ be the three angles corresponding to the several cases of a, b, c, being the uppermost side, then

$$(l+a)\tan\alpha + (l+b)\tan\beta + (l+c)\tan\gamma = 0.$$

⁂ It is particularly requested that all mathematical contributions be forwarded, at latest, by the 20th of each month. All new questions, in order to insure an early insertion, should be accompanied by their solutions.

SUGGESTIONS ON THE CULTIVATION, MANAGEMENT, AND PRESERVATION OF THE VOICE.

(*Continued from p.* 64.)

[The following remarks, addressed to Clergymen, have been published in *The English Churchman*. We extract them as being useful and suggestive to Masters.]

We have urged upon readers the necessity of learning to read in an even and sustained tone. The reason, perhaps, why so few attain to this, is because the difficulty lies where we are least apt to look for it. We do not discover the enemy, and therefore we do not conquer. Few men know whether they read in an even tone, or in tones rising and falling unnaturally. Men often think they keep to one tone, when they are actually offending and provoking the ears of others by the most absurd incongruous changes of tone. Men try to detect such changes of tone in their own reading, and they cannot. It is strange that it should be so, yet the fact is certain. "Habit will not account for this; the reader never drops his tone at the end of the sentences except when he reads in Church; the people hear him as often as he hears himself. Their ears never cease to perceive the dropping of the note; habit never makes their ears incapable of detecting it." Why then should we suppose that it is habit which makes *his* ear incapable of it? The reader's ear has not become incapable of detecting the very same changes of tone in the voice of another. Why then should he have thus become incapable in his own case, merely from habit? Again, we believe it to be a fact that almost every young reader, when he first stands up to read in a large church, does immediately drop to a lower note at the end of each sentence. This is not habit, for he never did it before in private, nor will habit now lead him to do it in private, and we believe that, at this commencement, he finds as much difficulty in detecting variations of tone in his own voice, as he does after years of habit. This is clearly not a fault of the ear induced by habit. There must be some natural cause for this in our organisation, and it is worth seeking for.

The writer's own experience and observation has led him to think that we hear our own voices in a different manner, and through a different medium, from that by which we hear the voices of others. There is certainly another way of hearing, besides through the external opening of the ear. If the reader doubt this, let him take a bar of iron, and suspend it by a string; let him set the bar in vibration, by striking it, and then suspend it close to the ear until the sound has wholly died away, and the ear takes notice of it no longer. Let him then press the string firmly to his temple, and he will then again distinctly hear the vibration; he may remove the string to be sure that the ear cannot discern the sound, and he may again apply the string, and hear it distinctly, without having renewed the vibration. This vibration is conveyed to the auricular nerve through a wholly different medium from that which enters by the external opening of the ear; and it is not strange that these sounds should vary greatly, from the different mediums they pass through. Let the reader strike the bar again, and, while he hears it with the ear, let him press the string to his temple; he now hears both ways at once. The sound is very loud, and very confused. We may hear our own voices thus in both ways together. This perhaps is not all; there is an air passage from the interior of the mouth to the interior of the drum of the ear. It is highly probable that the vibration of one's own voice is conveyed to the interior of the ear through this passage. The writer has often observed that the closing, or the sudden opening of this passage when closed, makes a far greater difference in the sound of his own voice than in the sound of another voice. This seems conclusive that we hear our own voices through this passage. Here there are three ways in which we hear our own voices, all of which may be in operation together, but to one of which we perhaps chiefly attend.

He who considers this, may be more ready to give credit to the warning that, if he attempts to judge of the tones of his own voice in the same way that he judges of the tones of another voice, he will almost certainly be deceived. Not that the way we hear our own voices cannot enable us to judge of the tone; but this way of hearing requires to be trained for the purpose. We have been all our lives listening to others; we have perhaps never listened attentively to ourselves. Our external sense of hearing is trained to detect variations in the tones of others; our internal sense of hearing is not trained to detect variations in our own. This seems the only account we can give of a fact that is too certain to be denied. Men do read in a medley of different tones, without being able to observe themselves what is painfully evident to every one else.

Let not the reader, then, too hastily assume that he has acquired the power of reading in a uniform and even tone. If he be wise, and if he wish not to be deceived, he will ask others to judge of it, and will believe their testimony rather than his own hearing. If he be fortunate enough to be acquainted with a good mimic, and have temper to be mimicked, this will be the most valuable assistance he can receive. [We have often thought this.—ED. *E. C.*] One such lesson may do more for him than all the instruction in the world, because it will shew him the necessity of exertion.

After a time, he will learn to distinguish by another sense, whether his tones vary or not. The writer of this, after several years of careful self-observation, can now judge of the tones of his own voice by the feel better than by the hearing; we cannot recommend much reliance on one's own ear, even after the most careful training. When the reader feels his chest still raised and full at the conclusion of his sentence, requiring but a very small replenishing of air, he may then be pretty sure that he has read the sentence in a tone evenly sustained. When he has acquired a power of judging by the feel of any alteration in the larynx in his throat, he may then know, with certainty, whether his tone has been sustained, and that wholly independent of his hearing.

There is certainly an imitative power in the organs of the human voice, which is to a great extent independent of our own hearing of the sounds we produce. It is probable that a man, who could have the voice of another, would be able to imitate that voice, although he had not the power of hearing the sounds which he himself produced. This affords great encouragement to the study of good reading when we are fortunate enough to hear it.

Let the reader now listen attentively to the next bad reader he hears. Let him mark the effect produced by the faults of tone we have been speaking of. Let him think how shocked he would be to hear himself read in the same way. Let him reflect that every one else may hear him read so, though he cannot hear it himself. He may be pretty sure that the reader he listens to is perfectly unconscious of his own faults. Let him then get a judicious friend to tell him candidly how he reads; and then let him consider what we have said of the means of correcting this fault.

We shall proceed in our next number to consider the organs of voice in the throat.

GENERAL EXAMINATION OF TRAINING SCHOOLS.

CHRISTMAS, 1852.

(*Continued from p.* 68.)

ARITHMETIC.

DIVISION I.

Section I.—Work one of the following sums so that the reason of each step in the working may appear:—

1. Subtract 35968 from 52071.
2. Multiply 4963 by 307.
3. If 13 things cost £15, what will 19 cost?

N.B.—This sum is to be so worked as to be intelligible to children who have no knowledge of fractions.

Section II.—1. A man buys 148 yards of cloth at 2*s.* 7½*d.* per yard; at what price must he sell it to gain £12 12*s.* 10*d.* by the whole?

2. Find by the rule of practice the cost of 6 tons, 7 cwt. 2 qrs. 17 lbs. at £3 10*s.* 7*d.* per cwt.

3. Having bought goods for £20, I sell half of them so as to gain 10 per cent.; for how much must I sell the remainder so as to gain 20 per cent. on the whole?

Section III.—1. Having bought goods for £18 I sell them four months afterwards for £25; what is the gain per cent. per annum?

2. Extract the cube root of 7 to 4 places of decimals, and cube the result.

3. Find the area of a floor whose length is 13 feet 7 inches and its breadth 11 feet 9 inches, and show by means of a diagram what surface is represented in each term of the answer.

BOOK-KEEPING.

Section IV.—What books are used in keeping a tradesman's accounts, and for what purposes?

Give examples of the headings and entries in these books respectively.

DIVISION II.

1. Prove in such a way as to make it intelligible to children one of the following rules of mental arithmetic:—

a. To find the price of 20 articles, every shilling in the price is to be taken as £1, and every penny as 1*s.* 8*d.*

b. If the price of an article be expressed in farthings, the price of 100 may be found by taking those farthings as pence, and their double, as shillings.

c. To find the interest of any number of pounds for a given number of months at 5 per cent. per annum; take the pounds as pence and multiply by the months.

2. A and B can build a boat together in 18 days, and with the assistance of C they can build it in 11 days; in what time could C do it by himself?

3. Taking any number of two or more places of digits, show that that number must leave the same remainder when divided by 9, that the sum of its digits does.

4. Approximate by the method of continued fractions to the value of $\sqrt{11}$, and show that the difference between any two of the consecutive fractions in the result has unity for its numerator.

EUCLID.

DIVISION I.

Section I.—1. Upon the same base and upon the same side of it there cannot be two triangles that have their sides which are terminated in one extremity of the base, equal to one another, and likewise those which are terminated at the other extremity.

2. The greater side of every triangle is opposite to the greater angle.

3. To a given straight line to apply a parallelogram, which shall be equal to a given triangle, and have one of its angles equal to a given rectilineal angle.

Section II.—1. If a straight line be divided into any two parts, the square of the whole line is equal to the squares of the two parts, together with twice the rectangle contained by the parts.

2. If a straight line be divided into two equal and also into two unequal parts, the squares of the two unequal parts are together double of the square of half the line, and of the square of the line between the points of section.

3. If from any point without a circle two straight lines be drawn, one of which cuts the circle and the other touches it, the rectangle contained by the whole line which cuts the circle and the part of it without the circle shall be equal to the square of the line which touches it.

MENSURATION.

Section III.—1. What is the cost of a wall of brickwork 72 ft. 6 in. long, 19 ft. 3 in. high, and 5½ bricks thick, at £4 per rod?

2. A coach wheel turns 280 times in a mile; what is its radius?

3. A pipe 2 inches in diameter discharges 20 gallons of water in a minute; what is the uniform speed at which the water is issuing?

4. What is the content of a tree whose length is 17½ ft., and which girts, in 5 equidistant places, as follows,—viz., 9·43 ft., 7·92 ft., 6·15 ft., 4·74 ft., 3·16 ft?

Section IV.—Give an example of a field book, and calculate the area of the corresponding field.

DIVISION II.

1. Equal straight lines in a circle are equally distant from the centre; and conversely, those which are equally distant from the centre are equal to one another.

2. About a given circle, to describe a triangle equiangular to a given triangle.

3. If two triangles have one angle of the one equal to one angle of the other, and the sides about the equal angles proportionals, the triangles shall be equiangular, and shall have those angles equal which are opposite to the homologous sides.

4. Show that straight lines, which are perpendicular to parallel straight lines, are themselves also parallel.

5. If from any point in the diagonal of a parallelogram, straight lines be drawn to the angles, the parallelogram will be divided into two pairs of equal triangles.

6. If tangents be drawn at the extremities of any two diameters of a circle and produced to intersect one another, the straight lines adjoining the opposite points of intersection will both pass through the centre.

ALGEBRA.

DIVISION I.

Section I.—1. Add together, $2(a+b)xy^2$, $3(a-2b)xy^2$ and $4(2a-b)xy^2$.

2. From $(a+b)x+(b+c)y$, take $(a-b)x-(b-c)y$.

3. Prove that $(a-b)(x-a)(x-b)+(b-c)(x-b)(x-c)+(c-a)(x-c)(x-a)$ is equal to $(a-b)(b-c)(a-c)$.

Section II.—1. Reduce to their simplest forms $\dfrac{a+b+\dfrac{b^2}{a}}{a+b+\dfrac{a^2}{b}}$ and $\dfrac{ax^2y}{bx^{\frac{2}{3}}y^{\frac{1}{2}}}$

2. Multiply $(3+\sqrt{-5})$ by $(2-\sqrt{-3})$

3. Reduce to its simplest form—

$$\frac{1}{x-1+\dfrac{1}{1+\dfrac{x}{4-x}}}$$

and find the square root of $13+2\sqrt{3}$.

Section III.—Solve one of the following equations:—

1. $4(x-1)-\dfrac{x-1}{2x}=3\tfrac{3}{4}$

2. $2x^2-x-2x\sqrt{1-x^2}=1\tfrac{1}{4}$.

3. A farmer buys a flock of sheep at the rate of £7 for every 5 sheep, he afterwards loses 9, and sells the remainder at the rate of £16 for every 11, and the sum for which he sells the flock is £24 more than that which he gave for it; how many sheep were there?

DIVISION II.

1. A blank paper book containing 48 sheets is sold for 14*s.* and another containing 78

sheets of the same size for 19*s.*, the binding cost the same in both, and the paper was of the same quality. What was the price of the binding?

2. A rectangular field is to be inclosed from the waste with a fence 40 chains long,it is to be surrounded, within the fence, by a gravel walk 6·05 yards wide, and there is to be left in the middle an area of 6·05 acres of grass. What must be the dimensions of the field?

3. $$\frac{1}{x^2+3x+5}+\frac{1}{x^2+6x+8}+\frac{1}{x^2-9x+7}=0$$

4. Find what sum of money at *r* per cent. compound interest will amount in *n* years o £*a*? And find the number of years in which a sum of money will double itself at *r* per cent. compound interest.

5. What annuity, to commence at the end of two years and to continue two years, certain, can be bought for £1000, allowing 5 per cent. compound interest?

6. If the present population of Great Britain be thirty millions, and the annual emigration—supposed to take place at the end of the year—be one quarter of a million, by what proportion must the number of births in each of the next two years exceed the number of deaths that the population may have increased at the expiration of that time by one-twentieth?

HIGHER MATHEMATICS.

DIVISION I.

SECTION I.—1. Find the common difference of a series in arithmetical progression, whose first term is 8, and the sum of the eight first terms 28.

2. Find the present value of an annuity of £A to be paid for *n* years, allowing compound interest.

3. Required the vulgar fraction equivalent to the decimal ·PQQQ, &c.; where P contains *p* digits, and Q contains *q* digits recurring *in inf.*

SECTION II.—1. Prove generally the rule for pointing off in the product of two decimal numbers as many decimals as there are in the multiplier and multiplicand together.

2. Define the logarithm of a number, and show that

$$\log_{10}\left(\frac{m}{n}\right)=\log_{10} m-\log_{10} n$$

3. What is meant by the *radix*, and what by the *digits* of a scale of notation? What is the number which is expressed by 2 4 3 1, in the scale of notation, where radix is 5? Prove the rule for expressing a number in any scale of notation.

SECTION III.—1. Prove one of the following formulæ of plane trigonometry:—

$$\text{Cos}\,(A+B)=\text{Cos}\,A\;\text{Cos}\,B-\text{Sin}\,A\;\text{Sin}\,B.$$

$$\text{Sin}\,\tfrac{1}{2}A=\sqrt{\frac{(S-b)\,(S-c)}{bc}}$$

2. How might the height of the top of St. Paul's above Wimbledon Common be determined by observations made on Wimbledon Common, from whence St. Paul's can be seen?

3. By what means can the distance from one another of two remote objects, C and D, be determined by observations taken from stations A and B, whose distance from one another is known, and whence the objects C and D are visible? Give the formulæ which must be used in this computation.

SECTION IV.—1. Investigate an expression for the area of a triangle in terms of its sides.

2. Prove the expressions for the circumference and area of a circle in terms of the radius.

3. Show that the solid content of a cone or pyramid is found by multiplying the area of its base by one-third its height.

DIVISION II.

1. Find the sum of the series $1^2+2^2+3^2+$ &c. to *n* terms.

2. Find the number of combinations of *n* things taken *r* together, and show that is the same as the number of combinations of *n* things taken $\overline{n-r}$ together.

3. Prove the binominal theorem in the case in which m is a positive integer, and expand $\left(a^{\frac{1}{4}} - b^{\frac{1}{4}}\right)^4$.

4. Show by the method of indeterminate coefficients that

$$\frac{x+1}{x^2 - 7x + 12} = \frac{5}{x-4} - \frac{4}{x-3}$$

5. Solve the equation—$x^3 - 441x + 2430 = 0$.

6. Expand a^x, and deduce from the expansion an expression—in a converging series—for the logarithm of a number to the base a.

PHYSICAL SCIENCE.

DIVISION I.

SECTION I.—Describe and explain one of the following instruments.

1. A barometer.
2. An air pump.
3. An electrifying machine and leyden jar.

SECTION II.—Describe and explain one of the following machines.

1. A locomotive engine.
2. A hydraulic ram and a fire engine.
3. A Clock.

SECTION III.—1. What must be the diameter of an iron wire to sustain 11 cwt. the tenacity of the iron being 25 tons per square inch?

2. How long will ten men be in pumping dry the hold of a ship which contains 3000 cubic feet of water, the centre of gravity of the water being 14 feet below the deck, and each man being supposed to yield 1500 units of effective work per minute?

3. Describe the wheel and double axle, and show how the relation of the power to the weight may be determined in this machine.

SECTION IV.—1. What experiments serve best to show the expansion of metals, and the currents produced in liquids and gases by the application of heat?

2. Give some account of nitrogen and of its compounds.

3. By what different methods may the chemical constitution of water be ascertained?

DIVISION II.

1. Show how it may be determined, by geometrical construction, whether the wall of a reservoir will stand or not, and prove fully the rule you use.

2. Wanting to determine the quantity of water discharged per minute from a pipe, I place under it a vessel, in the bottom of which is a rectangular aperture which I can close by means of a slide. I find that when the dimensions of the aperture are 4 inches by 3 the water stands steadily in the reservoir at a height of 3 feet. What is the efflux per minute from the pipe, neglecting the effects of contraction?

3. Given the number of units of work, u, which a man can do on each stroke of a pump, the depth, a, of the water in the well beneath the bottom of the barrel, and the section, k, of the barrel; it is required to find the length of the stroke, so that the whole work on each stroke may just be expended in raising the water.

4. What experiments show the influence of the state of the surface of a body on the radiation of its heat, and what experiments show the existence of latent heat?

5. Explain, fully, what is meant by the law of chemical equivalents, and what, by that of gaseous volumes. Give some account of chemical nomenclature, and chemical notation.

6. What are the chemical properties of oils and fats? What application is made of those properties to the uses of life?

QUESTIONS IN FARMING.

1. Write out a farmer's calendar from February to June.

2. How has the ground to be prepared for turnips? What is the time for sowing them? What rules are to be observed in hoeing turnips?

3. What is meant by the four course system? What are the advantages of keeping up stock as compared with pasture? What rules are to be observed in applying liquid manure?

MUSIC.

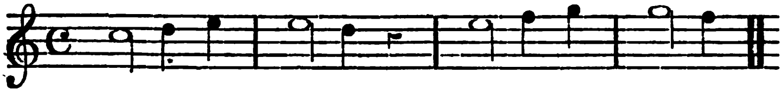
DIVISION I.

Section I.—1. Write out the substance of a lesson on beating time, with examples of all the ordinary cases.

Section II.—1. How is a very gradual increase or decrease of velocity or of loudness expressed? When a note is to be forced how is it distinguished?

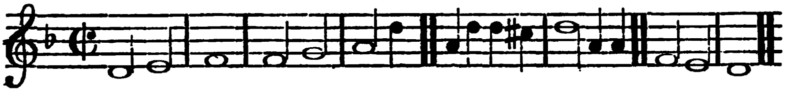
2. How many sounds are there in a *tetrachord?* How many tetrachords are there in a major scale? Give the names of the sounds of the tetrachord.

3. What rules ought to be observed with regard to *the turn* in singing? Write out the following melody with *a direct* and with *an inverted turn* introduced.

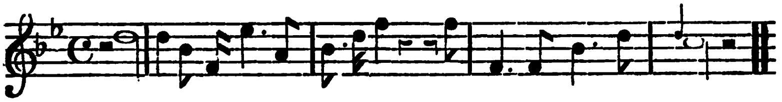


Section III.—1. Supposing that in a musical composition the time were to change from 𝄵 to $\frac{6}{4}$, what change would be required in the manner of beating? What would be the value of each of the beats in each case?

2. In what scale is the following passage written? State how you determine it.



3. What is meant by *reading in time?* Show the following passage should be read in time.



SUPPLEMENTARY PAPER.

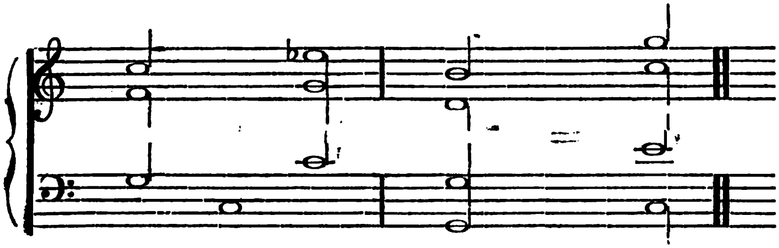
DIVISION II.

1. Explain, as you would to a class, what is meant by the terms *prime*, *harmonic chord.*

2. What rule is observed in arranging chords for more than and for fewer than four voices? On what principle is the rule based?

3. What are *sequences?* Explain the differences between *tonal* and *real sequences.*

4. Is there anything objectionable in the arrangement of the following chords?



5. In musical composition what relation ought to exist between the chords in order to produce the best effect?

6. Give a list of the *consonant* and *dissonant intervals*, distinguishing what are *anomalous*, *perfect* and *imperfect.*

PERSPECTIVE.

1. Explain what is meant by a perspective representation of an object.

Give such a representation of a right-angled triangle, when one of the sides which contain the right angle is vertical and the triangle is (1) above, (2) below the eye.

2. Define the following terms:—the intersection of the original plane, the parallel of the original plane, the vanishing point of a line, and the centre of a picture.

Illustrate your definitions by a diagram.

3. Make an accurate drawing of a cube, supposing the plane of the picture to be parallel to one of the sides, and the cube to be below the eye on the left.

Place upon it another cube of half the linear dimensions exactly over its centre.

4. Draw an accurate perspective representation of a square, the sides of which are parallel and perpendicular to the plane of the picture; having given the centre and distance of the picture, the side of the square, and the seat of one of its corners.

SCHOOL MANAGEMENT.

Section I.—State how you would organize a school if placed under your charge in one of the following cases:—draw a plan, showing the arrangement of your classes,—and give a copy of your time table.

1. 60 children, mixed, with no pupil teacher, but with a mistress who attends all day, and can teach reading and sewing.

2. 80 children, mixed, with a pupil teacher, and a mistress who attends in the afternoon to teach sewing.

3. 120 boys in a town, with two pupil teachers.

Section II.—1. Give the heads of a lesson on one of the following subjects:—

1. Lime.

2. The seeds, stems, and flowers of plants.

3. The transformations of insects.

Section III.—1. What are the proper sources of authority in a school?

2. What are the characteristic dangers to himself of the schoolmaster's profession?

3. What do you understand by the education of a child? What are the resources of a schoolmaster for accomplishing it?

Section IV.—1. In what particulars may the following defects in the character of a teacher show themselves to the children of his school and their parents?—selfishness—untruthfulness—improvidence.

2. In what way may the following Christian graces find their exercise in the work of the teacher, and, under God's blessing, with what probable results?—humility—love—a fervent spirit.

Section V.—1. On what does "value" depend? Why are gold and silver valuable? Give examples of things without value, and show why they are without it.

2. How must money be laid out to become "capital"? Give examples of different ways of so laying it out. Show, by an example, what would be the condition of a community without "capital."

3. What is the use of taxes? Give examples of the state of countries where no taxes are paid. Show that it is just to make every body pay them. What have the taxes to do with the national debt?

QUESTIONS FROM M'CULLOCH'S COURSE OF READING.

1. Give examples, from Dr. Arnott, of the wonders of civilization.

2. Give examples, from Adam Smith, of the division of labour.

3. Give an abstract of the lesson on the British Constitution.

Section VI.—1. In what manner are stratified and unstratified rocks found associated with one another? What are the great divisions of stratified rocks?

2. Give some account of the different kinds of organic remains, and of the strata in which they are found.

3. Give some account of the organs of digestion and respiration.

QUESTIONS FROM M'CULLOCH'S COURSE OF READING.

Give an abstract of one of the lessons entitled as follows:—

1. The animal economy.

2. Aqueous vapour.

3. First lines in optics.

To Correspondents.

A Subscriber.—We do not think that English composition is to be learnt by exercises (see Vol. VI., p. 21). Of those named, perhaps Parker or Graham will be found most useful.

Our paper on the Vauxhall Schools is unavoidably postponed.

PRICE'S PATENT CANDLE COMPANY.

FACTORY SCHOOLS.

Not many persons, perhaps, have travelled from the Waterloo terminus on the South-Western or on the Windsor line, without noticing a large corrugated zinc roof, nearly on a level with the northern parapet of the railway, a short distance from the Vauxhall station, on the Windsor side. There is something in the clean, neat, healthy-looking character of the roof itself, with its long row of circular skylights, amid all the dingy dirtiness and ruin, and foul offensive smells of that old and busy manufacturing quarter, which at once arrests the attention. And those who have had the misfortune to be familiar with the neighbourhood of a candle manufactory in old times, and to be compelled, even for a few moments in their business walks, to pass through its hot and greasy air, may be apt to feel some measure of surprise at finding that this building is a busy workshop of one of the largest candle factories in the world; and that here are prepared, by hundreds and hundreds of thousands, those "Albert Lights," and "Mortars," and "Child's Night Lights," which have driven from our bedrooms the old flickering and sputtering rushlight, with its Argus-eyed citadel.

But this Night-Light Factory forms only a small part of the works of the large manufacturing company to which it belongs. The chimneys of the Belmont Factory may be seen a little further off towards the river; and almost all the delicacies in the "candle line," which now relieve our eyes and our nostrils from the infliction of "the mould" and "tallow dip," are produced in immense quantities in this immediate neighbourhood, in the factories of "Price's Patent Candle Company."

Now it certainly is one of the great drawbacks to the satisfaction which we all experience at the wonderful improvement which has taken place of late years in all things which relate to our material comforts, that we are compelled to feel that each improvement has at the same time caused no small amount of misery. Thus, the journeyman tailor has greatly suffered for our cheaper coats, and waistcoats, and trousers; and our shirts and other linen are apt to assume the form in which they come to us, from the feeble hands of ill-paid wretchedness. Those who have been accustomed to work among the poor in the crowded districts of the metropolis are well acquainted with these things. But those who are also familiar with the working classes in the neighbourhood of factories, are well aware how much more appalling the *moral* effects of our extended comforts are apt to be—what irreligiousness, and misery, and vice are apt to result from the congregation of large masses of young persons of each sex in shops and work-rooms—and what a withering curse seems generally to fall on a parish and a neighbourhood on the first introduction of a large factory.

All this ought not to be. It cannot be that God has given us new skill in handicraft and increased powers of production, so as to enable us immensely to augment our creature comforts, and that on every side, in order that we should make each other miserable, and vice become extended, and He, the Giver, more dishonoured than before. We are not wrong to *use* His gifts, and thus extend our comforts. But surely we *abuse* them:—we *use them wrongly*. The increased riches in knowledge, and power, and substance which He has been so wonderfully bestowing upon us continuously for many years, and which have developed themselves so much in manufacturing skill, to the augmentation of our personal and social comforts, are surely meant by Him to minister to our real enjoyment,—physical, intellectual, and moral,—and to redound to His glory in making us both happier and better men.

All this has been felt by many, and urged over and over again. Clergymen, and schoolmasters, and governments have tried to remedy the evil; and many a noble-hearted manufacturer has endeavoured, at any rate, to mitigate it, by the establishment of factory schools and libraries. But it seems to have been left to "Price's Patent Candle Company" to prove that a large manufactory may easily be made a moral blessing to an entire neighbourhood, and become the centre of civilization, the fountain of intellectual and moral culture—ay, too, of religious feelings, and habits, and discipline.

Such the factories of this company really appear to have become. We have before us a "Special Report by the Directors to the Proprietors of Price's Patent Candle Company, respecting that part of the proceedings of the annual general meeting of the company, 24th March, 1852, which has reference to the educational, moral, and religious charge to be taken by the company over the persons (and especially the young persons) in its employment," by which it appears that at the general meeting of the proprietors, on the 24th of March, 1852, "the annual sum of 1200*l.* was voted for the continuance of the educational and religious arrangements, and a sum of 3289*l.* for the repayment of all past expenses."

This is no slight sum of money for the proprietary of a manufacturing company to expend on the intellectual and moral culture of their workpeople, and for the promotion of their psychological advantage. It was done, moreover, under no excitement, but deliberately, and after patient investigation; and was merely the adoption of a well-tested, long-tried system, which had grown up gradually under the fostering care of one of the managing directors, apparently on his own responsibility, though with the encouragement of his brother and coadjutor, and of one or two of the proprietors. What that system is will best be seen from the following document:—

"Extract from the Proceedings of the Directors at a Meeting held on the 18th March, 1852.

"Read report of the committee, appointed 29th May, 1851, for the purpose of making the following inquiries:—

"First—To inquire and report to the board the nature and extent of education at present available both to the children and adults employed at the company's works.

"Secondly—The outlay that has been incurred on this account to the present time, and from what source.

"Thirdly—The nature and extent of religious instruction available for the workpeople and their families in the employ of the company, and the facilities afforded them for attending public worship or otherwise, and

"Fourthly—Generally to suggest the course which it may be expedient for the company to adopt on these heads, and the nature of the propositions which it may be advisable to submit for the sanction of the proprietors.

"REPORT.

"Your committee have inquired into the subjects to which you directed their attention. And a short time since, in conjunction with Mr. Moseley (the government inspector of schools, who kindly assisted them), they went over the day and night schools provided for the factory children by Mr. J. Wilson, who in answer to their various inquiries has furnished them with the information contained in the letter which they lay before you herewith.

"That letter your committee consider so interesting and important, that they recommend its being printed as an appendix to their report, and in that form circulated among the shareholders before the next annual meeting. Nothing short of so submitting Mr. J. Wilson's own narrative, will in your committee's opinion do justice to his views, or enable the proprietors to judge how deeply they are indebted to him.

"Mr. Moseley expressed himself no less gratified than your committee were with the proficiency of the children, and the admirable system adopted by Mr. J. Wilson in connection with the night and day schools.

"The total number of young persons in all the schools on the day of inspection was 512. At some seasons there are many more; the number varying with the season of the year, and the consequent pressure or slackness of business;—the practice being to send children, when not required for work, up to the schools, where they are well taught and kept from evil, and are always ready again when wanted; whereas they would otherwise be liable to be idling about the streets, picking up bad habits, and perhaps might not be available when next wanted. Of course they are not paid except when at work, and great is their eagerness to be drafted back from the school to the workshops.

"It seems that children living in the neighbourhood of the factory are taken into these schools while yet scarcely old enough to work, and are thence drafted off into the work-rooms as vacancies occur, those being taken first who gain for themselves the best characters. This prevents the necessity of ever employing perfect strangers—a more important advantage, even in a pecuniary point of view, than might at first be supposed. The increased expense caused by these *out*-scholars is under 50*l.*, and the advantage obtained may, therefore, be considered as more than equivalent to its cost.

"For the particular details of the working of the several day schools and evening schools, your committee must refer to the explanations contained in Mr. J. Wilson's letter.

"His estimate of the annual expense of these schools is as follows:—

Candle Factory day school	£130
Candle Factory evening school	190
Night Light Factory boys' school	110
Night Light Factory girls' school	80
Total . . .	£510

"In connection with these schools Mr. J. Wilson has established a cricket ground, small garden allotments, and annual summer excursions. The benefits obtained by such means are admirably stated in Mr. J. Wilson's letter. Your committee would particularly call attention to the original establishment of cricket in the cholera year, as narrated in letter, p. 8, as also to the manner in which the cricket ground and gardens have mitigated the most serious evil connected with the factory—the necessity of night-work. (See letter, p. 11.)

"In addition to the other teachers provided for the factory work-people, there is a permanent chaplain, who visits the sick, acquaints himself with the homes of all the young persons employed, makes himself familiar with the characters of the men, reads morning prayers to the assembled work-people, teaches in the several schools, and exercises a general superintendence over all matters connected with the education and moral welfare of the company's work-people.

"In order to complete the system, and prevent the good work done in the week from being marred by the boys having no special place of worship to go to on the Sunday, a chapel has been leased and licensed; and your committee were especially struck by the reverential conduct of the boys and girls, by the regularity of their responses, and by the pleasing manner in which the singing and chanting were performed by them.

"The chaplain's salary is 200*l.* per annum (see letter, p. 19), which, together with the 510*l.* already mentioned, and the expenses of the cricket ground and excursions, 135*l.*, amount to a total annual expenditure of 845*l.*

"The chapel itself involves an additional expense of 260*l.* per annum, which would swell the above-mentioned annual estimate to 1105*l.*

"Mr. J. Wilson has from the time when these schools, &c., were originally instituted, down to the 31st December, 1851, expended no less than 3289*l.* of his own moneys, in such annual payments as are above enumerated, and in furnishing necessary accommodation, and purchasing books for the school children.

"Under these circumstances your committee think that it is for the shareholders at large to decide what the company ought to do in regard to the system of education so organized.

"Inasmuch as the children employed in the factories would, but for schools especially adapted to factory hours, be prevented from obtaining any education at all, your committee think that is the clear duty of the company to continue the present schools, and so to provide for the intellectual and moral welfare of those by whose labours every shareholder profits.

"The cricket ground and summer excursions seem to add so much to the efficiency of these schools that your committee think they should be adopted also.

"The chaplain and chapel, or at any rate an adequate number of sittings in the chapel, seem likewise to form an almost necessary complement to the educational system established by Mr. J. Wilson, and explained in his letter; but the duty of continuing them is not quite so plain, inasmuch as the candle factory has only availed itself of a pre-existing population, and has not, as is the case of many iron works and cotton mills and other factories, created around itself a new population unprovided with a church, or pastor, on a spot previously without inhabitants. The company's work-people may, no doubt, resort to the regular churches and ministers of the district; still, it must not be disguised, that without the concomitants of chapel and chaplain, the school system established by Mr. J. Wilson would lose very much of its efficiency and completeness.

"The reimbursement of the sums already expended on the schools, &c., constitutes a third question. Here again it is for the shareholders at large, and not for the directors, to decide whether the company shall remain indebted to Mr. J. Wilson, for all or any part of the sums expended by him for their benefit, and in the accomplishment of objects for the furtherance of which he has more than once refused friendly offers of assistance, as not considering himself authorized by the shareholders at large to accept charity in aid of institutions which he considered they had a prior right to support.

"Your committee have no doubt that the system of education introduced by Mr. J. Wilson has a direct bearing on the efficiency of the work done, and *pro tanto* on the pecuniary success of the company; and with reference to this point would especially call attention to the employment of boy labour in work, with which boys would not formerly have been intrusted, and which was, therefore, always performed by men, until, to save expense, machinery was for some time entirely substituted for hand labour, but without obtaining that perfect execution of the particular task, which nothing but hand-labour has hitherto been able to insure."

The system described in this Report appears to have received, since the date of it, some very considerable extension; for the Company finds in the liberal fulfilling of these duties to its workpeople as much a pecuniary advantage as a delightful enjoyment of a privilege. *E. G.* there appears to be, at the present time, *three* chaplains at work instead of one; and the wife of one of the proprietors has, for some time past, taken the whole moral supervision and direction of the female branches of the factory,—expending upon them much time and labour, and relieving the educational fund of all expenditure in those quarters.

We had the high privilege of being present, some weeks since, at a tea party given by this lady, in the Child's Night-Light Factory, to the girls of the factory schools and their immediate female relations. We are not unacquainted with factory girls generally; and were glad to obtain admission—in order that, from personal observation of the conduct and bearing of these young persons, we might form some idea of the nature of the moral work which was going on.

There were some hundreds of persons present—The factory girls and their immediate female relations, many ladies, and many clergymen and other gentlemen; and a considerable number of factory men, who had inrolled themselves into a body of stewards for the occasion. There was tea, and hymn-singing, and ballad-singing, (and very beautiful singing it was); there was the giving away of the prizes for general good conduct, and advancement in the factory, (and these prizes were books, and such books that we felt inclined to ask several of the girls for a loan of them); and then there was a lecture on chemistry (and it was a really good lecture), attended to by the girls with quiet, deep, attentive interest. Then there was the enjoyment of the German Tree, and then refreshments again, and then the Magic Lantern.

All this, together with the moving of the crowd from place to place—the attraction of various kinds of exciting amusements, with periods of trying quietness—all this together afforded no bad opportunity for observation upon the conduct and character of the girls, and for forming some estimate of the moral work which is going on among them. We did form an estimate; and it was a most favourable one. We could scarcely believe ourselves to be standing in the middle of an English factory. There was no coarseness, no flippant vulgarity, no put-on coyness and timidity, but a happy respectful confidingness in all; and the quiet modest self-possession and perfectly unaffected refinement of the elder girls was most remarkable. Indeed, we saw not one thing which gave us any pain, except the evidently most intense suffering of "the best girl in the factory;" who, on receiving her prize, was compelled to continue for a few unnecessary moments on the platform to receive the vociferous congratulations, and witness the somewhat tumultuous joy, of the whole assembled multitude. It is a thing of no slight danger to a *boy* to occupy such a position: but for it to be thrust upon one of the other sex, seems a thing positively contrary to nature. We are not sure that the persons in authority were responsible for the scene. But even if they were, they can afford to be told of *one* mistake amid so much that was excellent and delightful.

Towards the end of this happy evening we were rather amusingly recalled to a comparison between this and other manufacturing establishments which we have known, by a very factory-like punch from the elbow of a girl in whose way we were unconsciously standing; and who, having gained her purpose, flaunted by, with a triumphant laugh. "She is not one of us, sir; she is a stranger." There was no difficulty in seeing it. The poor thing, though sufficiently well dressed, looked like a savage among the factory girls.

The girls of the factory have not been so long attended to as the boys; for the whole matter at the first sprang up spontaneously with the latter: and so long as the educational system was comparatively a private matter in the factory, and entirely dependent upon Mr. Wilson, the managing director, he could not give to the girls very much of his attention. Moreover, it was not until a few months ago that he found a lady to undertake the supervision of them.

While, however, the female department was still without such a head, and the whole educational system was still dependent on Mr. J. Wilson, the moral effects which we have here alluded to were not entirely undeveloped. Messrs. Brownrigge and Conybeare had been appointed by the subscribers to investigate the system which Mr. Wilson was carrying on. We have before us the speech of the latter gentleman, at the London Tavern, March 24, 1852, recommending to the proprietors the adoption of Mr. Wilson's measures. We extract the following passage:—

> "The good effects of that system seem to me to permeate and pervade the entire working of our factories. Not long since I took a friend, himself a manufacturer on the largest scale, over our factories. The candle-making machinery, ingenious as it is—indeed it is the most interesting thing we have to show to the mere mechanician—did not so much elicit his admiration. But I shall not soon forgot his words or his looks on entering our Night-Light factory, where the large proportion of our child-labour is employed—as he looked at the healthy and happy faces, and clean and tidy dress of our girls, and watched their intelligent and smiling faces as (evidently amused at our inspection of their work) they looked up from the tasks which busied their rapid-glancing

fingers, he exclaimed, 'I never even *imagined* that factory labour could present a scene so cheerful and so pleasing.'

"If any of you think my picture overcoloured, go as shareholders, and inspect our Night-Light factory for yourselves. Everything you see there—the steady and cheerful industry, and the intelligent and even refined expression of those factory girls' faces will, I think, convince you how much the *morale* of the workers has to do with the efficiency of the work done, even when, as is the case with us, every thing that can be done by piecework is done in that manner."

The entire number of young persons inspected in the schools of the factory on March 2, 1852, seems to have been 512. And Mr. Wilson writes, in a letter to the Committee of Inquiry—

"If the inspection had been earlier in the year the number would have been a good deal larger, and a reinspection in the thick of next winter will, I hope, show 800."

And it is not a little interesting and instructive to see from what small beginnings these great results proceeded—how providential and yet how natural were their origin, and how lovingly and wisely the seed was nursed and cherished. Again we quote from Mr. Wilson's letter:—

"The schools began in a very humble way, by half a dozen of our boys hiding themselves behind a bench two or three times a week, after they had done their day's work and had their tea, to practise writing on scraps of paper, with worn-out pens begged from the counting-house. The foreman of their department encouraged them, and, as they persevered, and were joined by others of the boys, he begged that some rough moveable desks might be made for them. When they had obtained these, they used to clear away the candle-boxes at night, and set up the desks, and thus work more comfortably than before, although still at great disadvantages as compared with working in any ordinary school-room. My brother encouraged them with some books as prizes, and many who had been very backward improved much in reading and writing. The fact of the whole thing being the work of the boys themselves seemed to form so large a part of its value that we carefully abstained form interfering in it further than by these presents of books for prizes, and of copy-books, spelling-books, and testaments, and by my being (but not until long after the commencement, and after being much pressed and being assured that it would cause no restraint) always present at the school meetings to give them the sanction of authority, but taking no more active part than hearing the most backward boys their spelling.

"The first half dozen had now increased to about thirty, and it had become very desirable that they should have some better place in which to have their school meetings, that in which they then held them being dirty, exposed on all sides, and moreover requiring every school evening considerable labour to clear it sufficiently for the putting up of the moveable desks. Now there was one part of the factory which we had long looked upon as very dangerous in case of a fire occurring. It was a tall and rather old building, of which the three upper stories consisted of two very low store rooms and a loft, with a very heavy wooden staircase running all the way up, but boarded off from the rooms. We gutted all the upper part of this building, clearing out enough old wood to have burned down half a dozen factories if it had once caught fire, and making in place of the two lower store rooms, one lofty schoolroom, with an iron staircase up to it, and big enough for about 100 to work in. It is the lower one of the two rooms which you examined on Tuesday night, and there were 90 boys at work in it at that time. The making of this room was the first really heavy expense connected with the schools. I have very exact accounts of the whole expenses of these, and have tried, according to your wish, to divide them so as to show the expense of each part, and in this division I make the construction and furnishing of this room amount to 172*l.* If we had the same thing to do again, we could, with our present experience, do it a good deal cheaper; but, nevertheless, I look upon the benefits resulting from this room as out of all proportion to the expense incurred. Of this sum, 57*l.* was a payment to the company itself, for its expenses in making the alteration of the building.

"It was in the winter of 1848 that the boys got into this first school-room, still working entirely by themselves, so much so that the prayers, with which the school closed, now that the separate room had set them free from the bustle of the factory, were always read by themselves. But the school had more and more difficulty in working itself in this way. The increase of numbers made one difficulty. Then the very attention of some of the boys to the schooling made another, for they presently found that they had exhausted all the powers of instruction which the school possessed, and therefore left it, some few of them to look for better evening schools out of the factory. Then many of the elder boys of the factory had now joined the school, and being much more impatient of control than the younger ones, brought with them a necessity for a stronger government than they could themselves supply. Even a committee of themselves, appointed at a general meeting held for the purpose, failed to secure respect. It was not until after a very full trial, and until the school was getting quite into disorder, that the principle of self-government on which it started was superseded, at the earnest request of all the best of the elder boys themselves. Since that time the school has been worked entirely by authority, although the exercise of this authority is often guided by a general vote, as, for instance, in all cases of fixing the days and hours for schooling. Just now a proposal to attend school four nights a week, instead of three, during eight months of the year, in order to make holiday the four best summer months, has been carried by a majority of 5 to 1.

"We got into possession of the new room for the purposes of the evening school in the winter of 1848. In the following summer we availed ourselves of it to remedy an evil which we had long felt in the factory to some extent, and which, with the increase of the night-light trade, and consequent increase in the number of young boys employed, was now becoming serious. It is better that the night-lights should be made not long before being sent out, and, as the demand for them varies greatly, it is often necessary to take on a number of additional boys in a busy time, and then to let them go again when the demand slackens. In very many cases they were taken away from schools to come into the factory, but frequently did not go back to school again after once being at work, but idled about and learnt bad habits in the streets, until we could employ them again. The new room enabled us to start a day school, to which to send up young boys when not wanted in the work. There is still great difficulty with the elder ones,—those who would be quite out of place in an ordinary day-school, and are of an age when they ought to be working, and not schooling, in the day-time. Many of these have to leave us every spring. But with all the younger ones, the difficulty has been completely got over, from the time of starting the day-school. They pass from factory to school, and from school to factory again, at a moment's notice, according to the variations of the work, and are equally well employed, and equally forming good habits in each, and are kept in the same discipline in the one as in the other. There was a good instance of the working of this a little before your inspection of the school on Tuesday afternoon. When you asked the master the number in the school, he answered 'A hundred,' but that the week before he had had 140, the 40 having been since taken down to work. Probably, were you to see the school again a week or two hence you would find many or all of these 40 returned to it, to remain there until the next press of work.

"The day-school is not exclusively for boys who have been at work in the factory, but there are a great many taken into it before the age at which they are old enough for the factory; and when they have become old enough, those who have made for themselves the best characters in the school are taken first when new boys are wanted for the work.

"Before we had this sort of nursery-ground to the factory, we were often obliged, as the calls of the work for new boys were made at an hour's notice, to take on the first that came to hand. Some of these would be quite careless, and, as the night-light work is very delicate, even a single thoroughly careless boy can do a good deal of mischief, and give a good deal of trouble, before the fact of his being so is sufficiently proved to cause his dismissal. This part of the day-school set us free from the necessity of taking in boys whom we do not know. Except in very particular cases, even boys old enough to work are, on first coming on the place, sent into the day-school, if only for a week or two, as, if they should happen to be incorrigibly careless, the discovery of this is made there at much less expense than that at which it would be made in the factory.

"For the sake of getting money to carry home, and partly on account of the supposed great advance in life, the poor boys are very eager to leave the school, to which they come at nine in the morning, to work for five hours, for the factory, to which they must come at six in the morning, to work for just twice as long. This eagerness is I think a rule quite without exception, even in severe winter weather. The fact of his having at his disposal so great a prize for good conduct, as the sending a boy down to work, gives to the master much greater power over them than that possessed in an ordinary school. A friend, when looking into this one day, remarked that, with such power in our hands, we might, if we pleased, get up the finest school in England—that if we chose to start a school for 1000 boys, we could always keep it full. I think it possible that, if we get

> all things to work well in the factory, we may hereafter get up an entirely self-supporting school outside, from which to promote the oldest and best of the boys, into the factory free school, and from thence, as opportunity offers, into the work, so that the batch of boys annually taken into the factory should be the cream, so to speak, of a very much larger collection. The expense of this will not be greater than it is at present, and as the boys of the day-school will probably be the men of the factory hereafter, it is, for this reason, as well as that stated in the preceding paragraph, of great consequence that they should be well selected. We have tried to work in this way in connection with other schools outside, but no master likes to drain his school of his very best boys for the benefit of another school."

All this is intensely interesting. It shows how the evening school sprang naturally into existence ; and how, being nursed by loving hearts and prudent heads, the opportunity of the day-school grew out of it, apparently unexpectedly. This is God's usual way of dealing with us in such things. A privilege and a blessing lovingly and faithfully made use of, opens out to us another and a greater one. But we bring forward this lengthened quotation, not only to illustrate this truth, but because it very clearly points out, by a practical example which every one may understand, how it is that owners of factories, by thus doing their duty to their people, may greatly benefit themselves in pecuniary matters, and how the neglect of that duty is likely to cause them great pecuniary loss; and because it also shows most intelligibly, how a factory, instead of being a moral nuisance to a neighbourhood, may become a real blessing to it—how these so-called "hot-beds of vice" may become the main instruments of civilization and conversion in our long-neglected populous towns.

But highly satisfactory as this is, in respect to the formation and success of the day-schools, it is by no means all the good which has resulted from the affectionate and prudent nursing of the first evening efforts of the factory boys for their own improvement. It is, or has been, a common saying, but we believe it to be a most untrue one—that our only hope for the reformation of the working classes is with the young children. From personal experience we believe this to be untrue; and surely there is an unfaithfulness about it, judging from our Lord's example and from His promises. Mr. Wilson has been able to demonstrate that the theory is untrue. The evening school for the bigger boys is regularly and successfully carried on; and those who work in the factory at *night* (as many are obliged to do in hot weather), go to school for a time in early morning before they leave the factory to take their rest. All this, it must be remembered, is perfectly voluntary on the part of the lads themselves; and if it were only intellectual culture that they received from it, much good would even then result from the moral discipline which attends and is contained in such regular submission to a system. But it is by no means only intellectual culture that they gain. Nor is it only "religious instruction;" in addition—there is simple, quiet, warmhearted, regular devotion. Yes: factory lads on the borders of one of the very worst districts of the metropolis, assemble together regularly in quiet, simple, unostentatious, earnest devotion, when they leave their day work, or leave their night work, before they separate of an evening for their homes, after their gardening or their cricket, and before they commence their factory work in the morning. We know not where we have met with anything more touching and heart-cheering than the simple narrative of the following passages:—

> "When we got the new organ for the chapel, the small organ, which was there before, was moved into the lower school-room. In this room the chaplain has a shor service every morning, at a quarter to six, for the men, some of whom come just befor

beginning their day's work, and are there joined by others who have just finished their night's work. The time till six is taken up with singing a hymn with the organ, reading and explaining a few verses of the Bible, and short prayers. At five minutes past six there is a similar service in the same room for such of the boys as can attend.

* * * * * *

"After breakfast, at half-past eight, we who are of the counting-house, together with the two foremen, Mr. Craddock and Mr. Day, meet in the lower room for a short service, before the counting-house day begins.

* * * * * *

"Two of the above-mentioned duties of our chaplain had, like our cricket, their commencement under mournful circumstances. The six o'clock service for the men was begun on the occasion of one of our young men (a fine lad of nineteen, and a general favourite with all who had worked with him) being drowned through the swamping of a boat in which he and three others of our young men were rowing, with one of our boys to steer them. The three were nearly drowned also, and after this shock they wished for some help in religion between Sunday and Sunday, and this little service was begun for them while the factory was still in the state of excitement attending the search during many days for the body of the poor drowned boy. It was thought also that others besides these three might be glad to attend the service. But an unexpected difficulty presented itself: the men of the factory were afraid of each other; not with reference to the being seen attending to religion, but to the fear of being suspected of doing so in order to curry favour. This and other circumstances made the service have a most unpromising beginning, so much so, that soon after its commencement the reader would sometimes, for two or three mornings together, have to himself the little room in which the service was then held. But it grew by degrees. Unavoidable circumstances, however, afterwards occurred to check it, and then to cause its discontinuance. It was revived in the spring of last year, at the earnestly expressed wish of a few who had previously belonged to it. Being now made wiser by experience, we commenced it this time by a general invitation to all the men (on last Good Friday) to come if they felt disposed. This enabled a man to come without appearing to put himself forward. The little room was very soon inconveniently crowded, and the service was then removed to the school-room, and it is now, I trust, a permanent part of the factory arrangements.

"The other matter, having a mournful origin, is the counting-house service at half-past eight. It arose, like the cricket, in the cholera. Seven of us had been in the habit of going to the early daily service at Lambeth Church, but when the cholera became very bad, as the way to and from the church was through the low part of Lambeth, in which it most raged, and passed the two churchyards in which cholera burials were going on at the rate of from forty to fifty a day, we got frightened, being all of us more or less unwell. We then, with the assistance of one of the neighbouring clergy, began the school-room service, and have continued it since the cholera has passed away, because some are able to attend there whose duties will not allow of their going outside the factory."

The following extract is, perhaps, still more remarkable, and of most touching pathos:—

"The cholera seems an odd reason for taking to cricket, but I dare say the cricket had a very happy effect on the general health of our boys, and so may have strengthened them against catching it. We lost only one (an amiable and well-conducted boy of seventeen), although many of our boys lost relations living in the same houses with them. Always when the game was finished they collected in a corner of the field, and took off their caps for a very short prayer for the safety from cholera of themselves and their friends; and the tone in which they said their Amen to this has always made me think, that although the school was nominally given up for the time, they were really getting from their game so concluded more moral benefit than any quantity of ordinary schooling could have given them. They also met every morning in the school-room at six o'clock, before beginning work, just for a few minutes, to give thanks for having been safely brought to the beginning of the day, and to pray to be defended in it."

And this was not merely a transient result of fear, or other excitement—the habit so formed became permanent:—

"I cannot leave the gardens and the cricket without noticing that they have been the means of softening to the boys one of the greatest evils now existing in the factory—the night-work, for which the men and boys come in at six in the evening to leave at six in the morning. My brother and myself live in hopes of seeing this entirely done away with in the course of years. To do away with it now would require so very heavy an outlay, that we feel it would be out of the question to propose it. The boys who are on night-work do not go to bed directly their work is over, being generally unable to sleep if they do so. They used to dawdle about, or to take a walk, or in some other way get rid of the time till a little later in the day, when they went to bed just time enough to get as much sleep as they needed before getting up for work again. The same boys are not always at night-work, but there are two gangs which take it in turns; those who are on day-work one week are on night-work the next, and so on. Now all last summer the night-gang of boys on leaving work at six o'clock in the morning, went straight to our field, and there they thoroughly enjoyed themselves in gardening and cricket until about a quarter past eight; they then collected in a shed which we have on the ground to hear a verse or two of the New Testament read to them, and to say the Lord's Prayer together before going home to sleep; and the way in which they joined in this little religious service, coming as it did just as a part of their enjoyment, would make one hope for very happy effects from it. I think, had the factory and its profits belonged to me, and had the cricket and gardens cost double what I have stated, I should have thought it but a sort of conscience-money, well spent in thus strengthening the physical and moral health of these boys, obliged by the necessities of the work to keep such unnatural hours. On four mornings a week they went out in this way; on the other two they attended our school from six till eight, to prevent their falling behind through missing the evening school, which of course they must when on night-work. These two school mornings have continued through the winter."

We think we need make no apology to our readers for these lengthened extracts from Mr. Wilson's interesting and instructive letter. Nor do we imagine that we shall get into much disgrace by adding to them the following:—

"Occasionally in the beginning of the busy time in autumn, when we have had to take on a few elder lads, strangers, and they have been admitted at once to the school and cricket, it has been quite interesting to watch the rapid change, in external manner at least, produced in them, quite involuntarily on their part. The rough ones among them would on the first evening of the cricket, be rude and selfish in their behaviour; and the first evening in the school, they would take into their hands with an air of mixed insolence and shame, the book for the hymn with which the school closes, and then kneel down for the prayer with the same manner—a look of 'I won't refuse to do this, but I feel I am quite above it.' But a very few evenings in the cricket and school bring them almost unconsciously to the same habit of civility and reverence as the rest; and we may hope that the change, external as it no doubt must be at first, must by degrees work inwards, more or less. In a very kind note from Mr. Moseley, the day after he inspected the schools with you, he says, 'Be assured they *cannot* (not even if they *would*) become the same men as they would have been. We cannot escape the influences, &c.'"

And again:—

"The next thing to notice is the summer excursion. Our first experiment was on Saturday, the 29th June, 1850, when 100 went down to Guildford, starting by a train at, I think, half-past six in the morning, and coming back at nine at night. It was a beautiful day, and one of thorough enjoyment to them. Breakfast, dinner, and tea were provided to eat on the grass. They strolled about the beautiful country in the neighbourhood of Guildford, playing what was then our only cricket match of the year, the apprentices against the rest of the factory (for in the then state of our cricketing a match did not take very long to play), and in the middle of the day the clergyman of the little church on the top of one of the hills, with a lovely view round it, who had been begged for the use of the church, kindly came and did his part of the service, the boys, their books having been brought with them, chaunting their part as they do in their own chapel. I I had not felt at all sure how far this might chime in with the other proceedings of the day, but it did so most perfectly, partly, no doubt, through their having had plenty of the running about first. The church service was a quiet and resting pleasure in such a place, and under such circumstances, between the two divisions of the active pleasure which was the chief object of the day. The country about Guildford is so really country, so absolute a contrast in its quietness and extreme beauty to all the common life of these boys, that one felt what a world of new ideas and feelings they were being introduced to, the very many of them, at any rate, who had never seen anything like real country before. From the way they looked at and spoke of the country to each other when there, and spoke of it after returning, I am sure many of them if they live till ninety will remember that one day, and with a feeling more beneficial to their minds than any which months of ordinary schooling would be likely to produce."

We are inclined to go still further than Mr. Wilson in our speculations, and think it not improbable that "many of them will remember that one day" upon their death-beds, and feel its blessed influence in ages beyond the grave. Let us go back, if we can, to 1830 or 1840, and picture to ourselves 100 factory boys from Lambeth and Vauxhall stopping in the middle of their sports on their day of annual excursion to the country, to chaunt the services of the church—and with reverence and devotion! It seems a delightful dream, from which we dread to be awakened—it is a quiet reality!

We hope to return at some future time to the subject of this article; for there are other points which it will be most useful and interesting to discuss—the cricket, the gardens, the summer excursions, the tea meetings, the system of prizes, and many other things, some of which have been already alluded to incidentally. But perhaps the most interesting and instructive object of investigation is the *secret of the success* of all these endeavours—of that element of success which is involved in the human agency. To us it appears that this element of success is the loving spirit, and singular Christian prudence, and simplicity of purpose, of the Managing Director. This is most remarkably evident from his letter to THE COMMITTEE OF INQUIRY; and we think that it will prove a most practical and useful matter of investigation at some future period. Meantime we pay no compliment to Mr. Wilson, though we heartily congratulate him on the large measure of success which God has given him. We believe that a heart like his finds its satisfaction *in doing a duty*, not in pluming itself upon his success when it is done. It is in this way that real happiness is enjoyed, that heaven is foretasted upon earth. Mr. Wilson is a fortunate and a happy man, not because he has surprised us all by his successful operations in what has been considered by us a field of almost unsurpassable difficulty; but because God having appointed to him, as to every one of us, a special mission, he has been able clearly to understand what that mission is, and has found his enjoyment in fulfilling it.

LETTERS OF A GERMAN ON ENGLISH EDUCATION.

Translated from the German of Dr. Weiss, Professor of Joachimsthal College at Berlin, by Dr. A. Selfs.

(Continued from p. 73.)

THIRTEENTH LETTER.

The large School Societies.—The Church Party—and National Society.—Dr. A. Bell.—The Liberal Party—and the British and Foreign School Society.—J. Lancaster.—Privy Council on Education of the Poor.—Eager Defenders of Ecclesiastical Influence.—Denison.—The Opposers of Ecclesiastical Influence.—W. J. Fox.—Manchester System—or Secular Education.

Whereas in Germany, that article of the Peace of Münster which pronounced all schools to be an *annexum* of the Church, has been gradually disregarded, and is now entirely forgotten; in England, the right of the Church to superintend schools, and particularly national schools, has always been universally acknowledged. It is still an existing fact; a parson is a clerical schoolmaster, and a schoolmaster a lay parson. How many still adhere to this close connexion of schools with the Church, I have seen in the debate respecting education in July, 1850. In both Houses, a decided importance was attached to the religious character of national schools, and the care of them was vindicated as belonging to the different ecclesiastical corporations. Mr. Henley, in the House of Commons, called every education which did not foster strict Church principles in the hearts of children, a *milk-and-water slip-slop system.* But then the difficulty arises, how government can satisfy all the different creeds and sects which lay equal claim to the public means.

Nowhere is the religious principle of education so eagerly insisted upon as in the Catholic schools for the people; and, next to them, in those which owe their origin to the *National Society.* This Society came into existence in 1811, under George III., for promoting the education of the poor on the principles of the Established Church. It adheres to the method of instruction which Dr. Andrew Bell first practised in India. In various parts of the kingdom it has erected schools and several seminaries, such as St. Mark's College, at London, where the masters are also exercised in the liturgical practice, so that they may be able to serve as clerks. It receives a considerable sum in contributions, to which its success bears, however, no proportion. For it has been a general complaint, that this Society knew only the *rights* of the Church concerning education, and had little regard for her *duties* towards the children. Taking the haughty air of the privileged and Established Church, it is said to look down upon children with an air of infinite superiority, and to teach them perpetually to look upon themselves as mere objects of mercy.

This reproach is not unfounded. In Germany, the lower classes have had from the very beginning of the Reformation a different fate; they were taught by it and enlightened, for Luther felt compassion for their ignorant state, and pushed on his undertaking principally with a view to improve their condition; whilst in England, the Established Church disregarded the people from her earliest origin. As the Dissenters are generally alive to any defect in the Church, they have shown a zeal for national education which often served as a stimulus to the Church herself, and yet her endeavours have never been sufficiently persevering. Somebody applied, wittily, a saying of Bacon to the higher clergy of the Episcopalian Church:—"They are as the stars, which give little light because they are too high." In writing thus, you will, I trust, not suppose that I overlook the praiseworthy exertions of some bishops, such as Blomfield, Sumner, and others, who have searched out and relieved misery in its remotest places.

The more the Established Church maintains her title to lead and superintend education, without fulfilling the expectations connected with that task, the less people are willing to acknowledge her claims. It is said that she is not the Church of the nation, but a sectarian body, unfit for the business of teaching. This opinion has given rise to another Society, called *The British and Foreign School Society*, existing since 1805, and originally intended to propagate the method of instruction of which Joseph Lancaster, a Quaker, was the author. Mutual instruction, on which it relies, is now no longer esteemed in England higher than it deserves; it is only made use of, at present, in cases of necessity, and, according to what I learned from a member of that Society respecting the performances of their principal schools at London, they leave very much to be desired for the generality of the children, although some few instances of remarkable success of this system have occurred. But the seminaries of this Society are spoken of very highly, and give reason to hope that in a few years hence there will be plenty of masters for the schools of the Society. Their income and their expenses amounted in 1849 to upwards of 13,000*l.*, the secretary alone receiving 400*l.*

The British and Foreign School Society represents the liberal party in religious questions. Lord John Russell has given it his support. It is far from purposing a secular education of the people; we may read around the saloon of the Lancaster School at Manchester the words of George III.: "May every poor child in my dominions be enabled to read the Bible." The Society is well aware that religion, were it once discarded from the national schools, would be entirely neglected. Therefore it is unwilling to leave religious instruction wholly to the care of the parents, yet it admits the children of Dissenters, and attaches only a small importance to points of difference within the whole Protestant Church. It does not wish to teach religion without regard to the principles of Christianity, as some have imagined to be possible in Germany, but it intends to instruct children only in the general truths common to all Protestants, and to leave dogmatical differences to the clergyman out of the school. Their instruction is said to be *unsectarian*, or to embrace *Christianity without sectarianism.*

The statutes state explicitly that, in order to open the door of education to all, and to include the children of parents of all religious denominations, religious instruction was only to consist of readings in the Bible without explanation, which was left to their families or to their church. This neutrality has been set forth as the leading principle of the Society; however, they have been accused of deviating from it, as was indeed hardly to be avoided. Extracts from Scripture were said to have been delivered according to one particular belief, and dogmatical opinions had been alluded to during the lessons. For this reason the Unitarians withdrew from the Society, as their protestation against the orthodox faith, inserted in Mr. Dunn's "Normal School Manual," a guide for the masters, had been disregarded.

The tendency to useful knowledge is more distinct in this Society than in the National Society. Even parents of strict Church principles, being anxious that their children should learn something, prefer to intrust these schools with their education. Besides the Bible, they teach reading, writing, arithmetic, and for girls the simplest kinds of needlework. The annual accounts dwell with dissatisfaction on the fact that the children leave school too early, since most of them cease to frequent it before they reach their thirteenth year. This complaint is heard more frequently in England than in Germany; but it is well known among us too.

It is but just to mention also one proof that members of the Established Church are sometimes possessed of practical wisdom enough to know how they can allay and assuage differences of religious opinion. King Edward's School at Birmingham is accessible to Dissenters as well as to members of the Church. The former head master, who belonged to the Episcopalian Church, intended to introduce the Common Prayer-book for the morning prayers. He informed his pupils accordingly, and added that those who, as Dissenters, did not wish to join in the prayers, would be allowed to come a quarter of an hour later. This arrangement is still the same, and it has had the extraordinary effect, that most dissenting parents send their sons to the morning prayers like the others; they would never have done so if it had been attempted to compel them to it. The gentleman who was then head master is now Bishop of Manchester, having been raised to this dignity in reward for the admirable way in which he directed the school.

Since neither of the large Societies above mentioned is sufficiently able to supply the wants of the population, government determined, twenty years ago, to assist them with money, the amount of which has increased every year. In 1833 Parliament voted 20,000*l.*, and in 1849, 200,000*l.*, all for national schools; government claimed at first no influence over the way in which this money was spent. But this has since been thought requisite, and, as a certain systematical plan was to be adopted for this superintendence, the Whig Ministry appointed, in 1839, a *Privy Council on Education of the Poor.* This caused an outbreak of distrust and contradiction on the part of the patriots as well as of the clerical party, and as yet it has not been silenced. The former saw the French *bureaucratic* or the Prussian military school despotism, as they termed it, enter into England; and the clergy were afraid that the government might intend a secular education for the people, although the ministers never ceased to assert they intended a good secular education *based upon religion.* Government met the objections of the Church party with great forbearance, lest it might be obliged to give up the whole. It allowed to the clergy as well as to the Dissenters a veto in the choice of school inspectors. It did not forbid the dogmatical way of teaching, and introduced only by-and-by some school-books better suited to their purpose. Then it required, provided that its supplies were continued, that the schools of the Societies should submit to the inspection of a committee consisting of both laymen and clergymen, and that the masters who received appointments out of public means should undergo a previous examination. The ecclesiastical party is by no means willing to yield to these desires, and least of all would they consent to see children of Dissenters admitted, unless they learned by heart the Church Catechism, like the others. Though the clergy had done very little for the cause of national education before government interfered in its protection, yet now, when others have taken that task into their hands, the Church party oppose them, instead of joining in these endeavours; and while they expect at the hands of the government a pecuniary assistance, they will yet not submit to the conditions connected with these supplies. A part of the clergy are sensible of the contradictions which this line of conduct implies, and of their former neglect of education. But no unity can be arrived at, and it might be said of the two parties, "*Nec sine te nec tecum vivere possum.*"

In the mean while the Committee of Council has, during the short time of its existence, done much good, by erecting seminaries, building schools, procuring school-books, and providing much other apparatus. The ecclesiastical party find fault with everything they do. Archdeacon Denison spoke some time ago in a public speech of the "miserable offspring of Kneller Hall," a seminary near London, which is excellently managed. I am myself no friend to seminaries as places where to train schoolmasters, but I do not see why men that have met with hard experiences in their former lifetime should be the only fit masters, as it is advanced by the Church party. If the clergy had been less obstinate in their policy, the cause of national education would have been promoted more efficiently, and many measures would have been carried that now are left undone.

During the contest of the said parties some men, such as W. J. Fox and Cobden, have repeatedly proposed that government should not negotiate any longer with the Church, but promote secular education. Fox has defended this opinion with undeniable zeal, and his publications as well as his parliamentary speeches have gained many adherents for it. Yet some of his propositions have, instead of lessening ecclesiastical influence, as they intended, rather given occasion to the clerical party for a full display of their own power.

"Why should we," says Fox, "isolate religious instruction? Is not knowledge itself a religious business? Religion always refers to things; there is not a chapter in the whole Bible which does not offer a great variety of worldly instruction, and there is no object in nature in which there is not something divine. The more knowledge elevates us above sensuality and error, the more life becomes spiritual or religious, for knowledge lets us comprehend every object as a part of the Divine harmony of the world." This mode of argument imposes only on few persons in England. Mr. Fox is still less persuasive when he would remove the classics out of the higher schools, because they gave as little introduction to the abilities requisite in life as the Bible did in the national schools. He owns that he would like the State to punish the parents for the ignorance of their children. These views must draw aside from his party also such as are no friends of the Church. He has, however, made some correct observations. He justly censures the custom of teaching children reading and spelling out of the Bible, and of applying Scripture for everything, as it must have the effect of tiring children, and of destroying their relish for the Bible. He wishes that arithmetic, geography, and geology were taught to a certain degree in national schools. He has recommended much the schools of Prussia, which are indeed taken as a model by the present government; but the reasons that led Mr. Fox to approve of our system are such as to set everybody against it.

The majority of the English would rather choose the Church as manager of the national schools, than consent to a secular education which might endanger the country's future by training a generation without religious principles. This is the reason why in cases of necessity immense sums have been raised for protecting the religious principle of education, or for erecting new schools for the strengthening of the Church. The recent occurrences on the Continent have only increased the power of the clerical party in England, for the revolutionary state of the continental nation showed plainly whereto an education leads when it is only actuated by worldly ends. Sir Robert Inglis said some time ago in Parliament, he thought that kind of moral corruption was impossible in England, which had of late come to light in the countries where they had the most advanced schools. It is true that the total difference of political conditions was one principal reason why Germany witnessed these outbreaks of license and anarchy; but this apology will not justify us wholly. Where religion has lost its influence on the people, the cry for liberty will be more violent, and the exertions tending to it utterly unruly; for the bridle is taken away from the appetites and desires of man. France exhibits another proof of this truth, though I will not join in accusing Guizot that *he* had prepared the soil of his country for Communism by promoting an instruction destitute of the religious principle. Even M. Thiers has of late become so much aware of what the people of France is most in need, that he desires a clergyman to be appointed by the State for every community, "who would at least teach them, in the name of Christ, that pain and privation are a necessary condition of this life." In England the clergy have often called public attention to the fact, that overruling of our passions and appetites was the mark by which education was to be judged; and since on the Continent national education had not exhibited this mark, they conclude that an education which gave a nation neither religion, nor morality, nor civil liberty, nor political liberty, was not worth having.

Other reflections tend to confirm their views. Supposing education is made quite secular, it is to be apprehended that the master will lose a great part of the authority and dignity which supports them as ministers of the Church, or as acting in her name. In short, it is certain that the Church must, somehow or other, have a part in the business. It might be wished that the clergy were less opposed to the views of government and more ready to join in providing for the urgent wants of the people.

A clergyman of the Established Church whom I asked what he thought of the frequent conversions to the Roman Catholic Church, replied the ignorance of the people was the chief reason of these occurrences; and the fault lay with the Church, which, forgetting the true principle of the Reformation, neglected to enlighten her flock, and left it to go astray in the wilderness. "Preaching," said he, "is not sufficient, and the poor do not come to us, but we must go to them. The Romish Church condescends far more to the wants of the lower orders, and her monks, as well as her whole clergy, stand in the nearest connexion to the people. But this condescension is not to be met with amongst the English clergy, and the Roman Catholics know very well where our Church is defective, and how they can make use of our weak points."

On the other hand, there is danger also from the party of secular education. At Liverpool, at Edinburgh, and particularly at Manchester, trials have been made with this system; they were intended chiefly as protestations against the intolerant spirit of the Church, and have for this reason been encouraged by a great many persons. In such national schools religion was entirely excluded and considered as a private business; the parents were allowed to choose the subjects of instruction for their children. It is hardly credible in what children are trained there, in order to render them the sooner fit for business. The subjects of instruction are popular physiology, phrenology, anatomy, and political economy. If we consider whereto an education thus managed must lead, and how many short-sighted fathers and mothers wish their children to learn only those things of which they can make use in the market of public business, caring little for their spiritual wants, we cannot but believe the endeavours of the clerical societies to paralyze such attempts indispensably necessary, and desire the general success of the Church party, provided that it put aside its petty party considerations.

FOURTEENTH LETTER.

Close Connexion subsisting between Church and Schools in England.—King's College.—London University.—Dr. Thomas Arnold.—His Opinion respecting the Qualities required in a Head Master.—The Religious Character of his School.—Conclusion.

I HAVE in my two last letters described the state of national education in England, and pointed out the great disproportion which exists between its low standard and the rich resources of the country. I said it would be the business of the Church to do more for national education than she had done hitherto. It is believed in England that secular education is unquestionably an abstraction, and the schoolmasters do not think of contesting the influence of the Church. Nor is it necessary there to demonstrate first theoretically the connexion of Church and schools, as has been tried of late in our country. Most masters at the public schools are clergymen, and it would be an unheard-of occurrence that the principal had not taken ecclesiastical orders. Only one example I have heard to the contrary, when I once had a conversation on this point with some schoolmen in England; namely, when Queen Elizabeth appointed Camden to the Rectorship of Westminster without having been ordained. Dr. Arnold considered himself at Rugby as the real and proper religious instructor of his pupils, and he pronounces this opinion distinctly in one of his letters. He says also, though not in the same letter, most persons would never like to be masters in England if they had not the character of a divine; "for the profession of a clergyman is considered universally in England to be the profession of a gentleman." With us the case is very different. The consideration which either a teacher or a clergyman enjoys in Germany quite depends on his own personality; while in general the profession of a lawyer leads to higher rank and position than either, and gives a greater footing than those. Therefore young men of ambition rather settle upon this profession, and Church and schools are supplied either by such as feel a particular desire for one of these vocations, or more commonly by those who have not sufficient means. In England masters derive a great part of their respectability from the Church, of which they are members. The care of souls is their object; that they consider this as their appropriate province, I learn from the letter of a head master which came into my hands. "I take good care," writes he, "not to promise that I would treat my pupils with parental tenderness; no other person can feel for a child like his father and mother. But as a Churchman, I have always felt myself *in loco sponsoris*, and thought I was as much obliged to take care of children as if I had pledged myself for them at their baptism." This manner of thinking is, I believe, general; it is the happy result of the clerical qualification of teachers.

Of all the recent establishments, none prosper better than those that have a religious basis. Thus King's College at London, which has existed since 1828, and comprises university instruction besides that of public schools, has met with great success and public confidence. The establishment bears the inscription *Sancte et sapienter*, and the school accounts begin with the declaration that the college had been established upon the following fundamental principle: "That every system of general education for the youth of a Christian community, ought to comprise instruction in the Christian religion as an indispensable part, without which the acquisition of other branches of knowledge would be conducive neither to the happiness of the individual nor to the welfare of the state." Accordingly, all the students are obliged to be present at the daily morning prayers, and besides this, they must hear certain lectures on divinity, not excluding those who study medicine or military science. For the acquisition of prizes and of scholarships, they must pass examinations which require an accurate familiarity with Scripture. Many of the questions occurring there, concerning the history or idioms of the New Testament in the Greek text, are such as scholars of our gymnasia would not be able to answer. Some are indeed rather especial, and unconnected with the subject; but generally they presuppose a knowledge of the Bible, which we should look for in vain at our schools.

King's College was established in opposition to Lord Brougham's London University, which, in excluding all religious instruction, afforded to Dissenters an occasion for acquiring degrees. The name of the latter establishment has been changed into London University *College*, when in 1836 the present London University was erected, in order to examine the pupils of the two mentioned metropolitan colleges for taking degrees, and also scholars from certain other colleges of the kingdom. Thus, London University is in fact nothing but a committee for examining and for conferring academical degrees. The examinations regard principally languages, mathematics, medicine, and natural philosophy, in rarer cases also the law. The degrees to be acquired are those of Bachelor and Master of Arts, Bachelor and Doctor of Laws, Bachelor and Doctor of Medicine. The candidates of arts, or what we call *humaniora*, may, if they choose, pass an examination on the Bible, and can receive a testimonial for it; but they are not obliged to answer any questions referring to this subject. Dr. Arnold could not go any further on account of the dogmatical scruples of the Dissenters. It was a painful experience to him to witness the rise of an educational establishment without a certain religious character in the capital of the kingdom; but when he saw his struggle against this "antichrist of utilitarian disbelief," as he termed it, unsuccessful, he withdrew entirely from the London University; for he believed that education amongst a Christian nation was impossible, without an open confession of Christian faith and strict adherence to religion.

If we would sketch the image of an accomplished head master according to the views of Dr. Arnold, as they are stated in his letters, the first of the qualifications requisite would be that he was a Christian of solid principles, and the second that he was a gentleman; after this only a thorough erudition combined with the talent of teaching would be required. Once he finds in a passage of Scripture (2 Tim. i. 7) the three great requisites in a schoolmaster, "spirit of power, and of love, and of a sound mind," he supposes that a manly character, as that of an accomplished master ought to be, will always take interest in public life and the affairs of the country. "I am sure," are his words, "that the more active my own mind is, and the more it works upon great moral and political points, the better for the school, because education is a dynamical not a mechanical process." He desires a master should be "public-spirited, liberal, and entering heartily into the interest, honour, and general respectability of the society which he has joined;" he would never accept a colleague who did not enter heart and soul into the spirit of his school.

In these descriptions he draws his own image. Indeed, his character has exercised the most decided influence on all his scholars; his whole person was calculated to make them imitate himself. He seemed to look deep into their hearts, and they experienced the warmth of his own heart by his earnest care for their welfare. Like a real sponsor he watched over their spiritual good. Religion was not perpetually on his lips; on the contrary, he seldom talked to them on religious subjects; it was rather the general and all-pervading tenor of his mind, and excellently suited to that harmonious and youthful spirit which remained peculiar also to his age. He believed the intercourse of a master and his pupils could not be gratifying to either "*without that liveliness and sympathy with creatures so lively as boys naturally are.*" Therefore he often advised young Oxford men of severe clerical principles and morals to renounce the occupation of teachers.

It is a remarkable feature of Arnold's character, and it endears his memory in no small degree to my mind, to find so much liberality respecting the treatment of boys in one who was so eager to defend the kingdom of the Lord. Far from expecting from the youth a degree of moral perfection of which their age is not susceptible, he writes thus:—"My object will be, if possible, to form Christian men, for Christian boys I can scarcely hope to make. I mean that, from the naturally imperfect state of boyhood, they are not susceptible of Christian principles in their full development in their practice, and I suspect that a low standard of morals in many respects must be tolerated amongst them." How wise his moderation has been his success may prove. Of the 700 scholars who were in Arnold's care at Rugby, the majority have, as is generally acknowledged, excelled at the universities as well as in later life by a manly spirit and a dutiful, earnest disposition. For their school had imparted to them a sense of justice, the characteristic quality of a Christian education, and, as Arnold says himself, the highest virtue of which man is capable, and the last at which he arrives.

A similar renown to that which Rugby had under Arnold, is now enjoyed by Harrow Grammar School, under its head master Dr. Vaughan, a pupil of Arnold, and an heir to his firmness of character and genuine Christian liberality. At Winchester, it is said, Tractarianism has entered lately.

The connexion of schools with the Church, however differently it is understood in different parts of the country, has yet never ceased to be universally acknowledged by parents as well as by teachers. If *we* wished in Germany to establish gymnasia, or schools in general, on a Christian basis, we might look upon English establishments and the conditions of their existence as a pattern to guide us, or as examples to warn us; but instructive they are in every case for those that have not discerned the final result at which the history of our own schools is arrived. To enter upon this subject would be to trespass beyond the limits of my travelling notes.

I conclude my communications on education in England after they have arrived again at their starting-point—Dr. Arnold. You have had the fortune of enjoying his personal intercourse. I have, at least, formed a clear idea of his excellences, and the nature of his activity. You will, I hope, not accuse me of having fallen into a blind admiration, or valued things beyond their worth. If I call to my mind the whole impression which English schools left on me, I think, nevertheless, that England forms the most vital branch of the large German tree, and that, planted in the most fertile soil, and sheltered by her insular position, she brings forth the noblest qualities of the stem, handing them down from generation to generation. Those elements which the navigating tribes of the north imparted by later immigrations to her old inhabitants, have been moulded together with those native qualities into indissoluble unity and firmness, like the different substances of Corinthian brass.

This origin and this seclusion of the English nation have stamped her people with a busy and active principle, which prevails also in education. It produces a strongly developed individuality of character, although it offers but a small amount of knowledge. It renders men fit for action, for it infuses into the mind persuasions, and bestows religious habits and customs, which more than knowledge determine the actions of man. The intellectual part of education is made subservient to the moral part; and actuated, as education is in general, by the historical conditions which support society in their country, it is excellently adapted to form citizens imbued with the character of the nation.

Instruction labours under various defects: it tends to useful knowledge: it is less abstract, less fertile of delusive and specious information; but it is without the scientific spirit which pervades the majority of our schools. If it were possible to combine the ardour for investigation, the thorough erudition of Germany, with the standard of moral advancement, the highly-developed character of English minds, education would attain a perfection not yet witnessed in the times of Christianity, and which perhaps only once has ever been attained on earth, I mean in the best period of Hellas—a perfection which would be as much more difficult to arrive at as Christianity is superior to antiquity, and as the purposes of a Christian education leave far behind itself any design which education followed in the times of the ancients.

AGRICULTURAL SCHOOLS IN IRELAND.

It appears from the last (the eighteenth) Report of the Commissioners of National Education, that a varied and useful system of agricultural instruction is gradually extending itself, under their superintendence, through various parts of Ireland. The details of its working in each school are given in the reports of the agricultural teachers, inserted in the Appendix to the Report of the Commissioners. From these it appears, that although the beneficial effects produced by the agricultural schools are not yet fully developed, yet sufficient evidence has been afforded of the practicability and advantage of combining industrial with literary education. Such a combination keeps in vigorous action the physical powers and mental faculties of the children; and, by teaching them to labour, gives them habits of useful industry.

It may be observed, in the first place, and in order to prevent unreasonable expectations, that although the question, whether the agricultural departments in the schools are self-supporting, is a point not to be overlooked, yet it is one of secondary importance, compared with the beneficial effects they are calculated to produce on the moral character and habits of the pupils. Add to which, that the present loss in the agricultural department arises mainly from the preliminary steps which are necessary in order to bring the farms into order, as appears from the following passage in the report of an agricultural inspector:—

> "The results, in the shape of pecuniary profit, realized at the different school farms differ materially; but it must not be supposed that such results are an index to the efficiency or non-efficiency of the teachers. Various circumstances, besides the industry and ability of the agriculturist, will combine to affect the result of his labours; and unless, where the cases are equal in respect to advantages and disadvantages, the pecuniary result of the year's operations does not afford a sure criterion whereby to judge of the merits or demerits of the system by which they were produced, although they can be useful in many other ways, such as showing the results obtained in different localities, and under different systems of management, and by comparing the results of any year with those of the preceding, the progress or retrogression in *individual* cases may be ascertained. It may be observed, and perhaps unfavourably commented on by those unacquainted with all the circumstances, that in some of the schools, especially those under the immediate management of the commissioners, there has been a *loss* in the agricultural department; but it must be borne in mind that most of these schools are but very recently established,—that in almost every case the farms connected with them were in a most exhausted condition,—that most of the energies of the agriculturists are directed to the effecting of the preliminary and indispensable improvements, and to bringing them under suitable and regular rotations of cropping; and until these preliminary measures are completed, and the farms in working order, it would be unreasonable to expect profitable pecuniary results."

As a proof that such loss will probably be only at the commencement, and also that the moral advantages of the system are abundantly sufficient to compensate any such temporary drawback, we will quote the subjoined extract from the Report of the Clones Union Workhouse Farm:—

> "The funds needed at the outset for farm seeds, manure, stock, &c., were advanced out of the rates, and were afterwards replaced to the credit of the union by instalments arising from the sales of butter and surplus vegetables, &c., leaving a clear balance in favour of the farm, upon inventory and valuation made by the board of guardians, amounting in stock and capital to 486*l*. 8*s*. 9*d*.
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> "One other result should be noticed, which is most important and most encouraging. I allude to the well-known fact, that since the commencement of the farm there has been an increasing willingness among the ratepayers to employ the young male and female inmates of the workhouse as farm servants. Before, they used to allege '*they*

were good for nothing;' now there is a kind of competition to get them. The boys are invariably preferred out of the 'agricultural' class; and some of them have been sought after and hired by farmers from the neighbouring unions. The girls, as they grow up, are taught washing, scouring, and mending; and for the most part they receive, in turns, instruction from the matron in the feeding and management of farm stock, and the ordinary outgoings of the dairy."

"It may be remarked that the Clones workhouse has forty acres of good land attached to it, which enables the guardians to keep twenty stall-fed milch cows of the most approved breeds, and the same number of pigs; the former producing a greater supply of milk and butter (which forms so heavy an item in most workhouse accounts) than is necessary for the consumption of the inmates. In fact, whilst walking through the house and over the ground attached, the place seems to change character, for instead of believing you were in a workhouse, you would imagine you were in some large industrial and agricultural establishment—the girls being instructed by the schoolmistress in a kind of coarse but profitable embroidery (better known in the locality by sprigging), whilst the boys are engaged in the out-door labour on the farm. This is most encouraging, and shows, that instead of workhouses being the scene of riot and confusion, they may become, throughout the country, the models of enlightened labour and active industry."

The agricultural and other industrial instruction which the commissioners are endeavouring to promote, is intended to be only supplementary to the ordinary branches of school instruction. The latter is regarded as the primary object; and accordingly grants are never made to schools exclusively agricultural or industrial. The only aid that the ordinary agricultural schools receive from the commissioners is an addition of 5*l.* per annum to the master's salary; and, in a limited number of cases, a small weekly sum, not exceeding sixpence, to each of the pupils who assist in cultivating the plot of ground attached to the school. The teacher generally pays the manager a moderate rent for the farm, and receives the amount of the produce sold.

Theoretic as well as practical instruction in agriculture forms a principal feature in the education of the boys. The greatest difficulty is to procure qualified instructors, and to find combined in one person manual skill and dexterity in the actual use of every agricultural implement, and identification with his business, so that, when necessary, he will be found not only directing but practically exhibiting at the head of his industrial class, or of his paid labourers, how to use improved implements in the drain, the furrow, or the farm-yard; clear and distinct ideas of the details of the most improved systems of husbandry, so far as it is a mere art, the suitability of each system under varying circumstances, and ability to carry out the details. Knowledge of the scientific principles of chemistry, geology, animal and vegetable physiology, and of those sciences which are collaterally connected with agriculture, is comparatively of less consequence, provided the instructor is thoroughly versed in the remainder, has the faculty of imparting what he knows both as to hand and head, and is gifted with common sense. Experience proves, that in the absence of experiment and sensible illustration, boys can form no correct idea of even simple chemical changes, and that it is, therefore, all but a waste of time to put catechisms, &c., into their hands, from which they learn to speak familiarly of elements and combinations, of whose properties, beyond the acquisition of mere names, they have no clear idea.

In agricultural instruction it is considered the most judicious course to point out the errors of Irish farming, and to make the pupils fully acquainted with the most practical subjects at first, namely, classification of soils; the kinds of crops best adapted for the different soils, and how they may be improved; a knowledge of the different rotations, and the kind of soil each is best suited to; also draining, subsoiling, trenching, the general cultivation of different crops, and so forth. A proper knowledge of these practical details prepares the mind of the student for receiving instruction of a more scientific character. "In my remarks," writes one of the teachers, "I confine myself to *matters of fact*, and avoid, as much as possible, all hard and unusual phrases, being convinced that when a boy or a man is entering upon any science, the easier the path is made for him the better. In chemistry especially, I have observed, that the lecturer, when he is unable to illustrate his subject by ocular demonstration, generally involves his hearers in a mist of unintelligible verbiage, which instead of affording instruction, tends only to excite ridicule."

In order to unite theoretical knowledge with practical, the pupils take part in the operations of the farm, particularly the sowing, thinning, and weeding of green crops. In every case they have evinced the greatest desire and anxiety for learning agricultural processes. Their attention is chiefly directed to one or two varieties of crops, until they are gradually made acquainted with the growth and management of all. In one case, where the parents of the pupils employed on the farm seemed not to like that their children should be obliged to work so much each day, even though paid sixpence per week, practical instruction on the farm has been given daily from half past twelve to a quarter past one, during the summer half-year—that being the time allowed for recreation—and this has been found to have a very beneficial effect. In another instance it is mentioned, that the pupils work very well an hour each day on the farm, and the dislike they manifested towards it at the commencement is gradually disappearing. In this school the advanced classes read a lesson daily in the "Agricultural Class-Book," and are frequently exercised in pointing out the errors prevalent in Irish farming, with the measures by which they should be remedied; and there is also a class who perfectly understand "M'Arthur's Agricultural Catechism." This, it is added, is mainly attributable to the competition excited by the liberal prizes given by the Earl of Bessborough to the pupils who distinguish themselves by their proficiency in agricultural knowledge, at the annual examination of his Lordship's schools. And it is deserving of notice, that a considerable number of young men, whose avocations do not permit them to attend the day school, have anxiously embraced the opportunity of attending an evening school during the winter nights, and so much pleased have they been with the instruction they have received in agriculture, that they have requested that the evening school may be continued during the spring and summer.

To show that the industrial training does not in any degree interfere with the literary instruction, it is mentioned that in one case, at the half-yearly examination of the scholars attending the day-school, it was found that those boys who obtained the most premiums for good answering in their respective classes were the members of the "industrial class." This was the more gratifying, inasmuch as it had been very frequently stated by the parents that the industrial training of the boys would interfere with their literary progress at school. This prejudice is now in a great measure removed; and when vacancies occur in the industrial class, the parents evince a lively interest in having their sons admitted. In fact, experience has already shown, that there cannot be a greater error than to suppose that the general progress of the children will be at all diminished by imparting agricultural with literary instruction.

One most important particular connected with these agricultural schools is the desire manifested by the boys to learn the improved systems of agriculture. This appears in the attention they pay to instruction, and in their willingness to perform any work apportioned to them during the time for labour. They seem to take both pride and pleasure in executing their work in a neat and tidy manner. Many of them will come a distance of one, two, and three miles to attend the school and assist in the operations of the farm, and work before and after school hours. It will scarcely be credited what a large amount of information they acquire, and with what eagerness they receive instructions on subjects that, up to this time, were altogether unheard of by them. It is highly pleasing to observe the willingness with which both paid and unpaid pupils work. Only a few are able to do much with the spade, an employment in which they take the greatest pleasure.

In one of the unions, in which the teacher was directed to exercise the boys in the fields, by working instead of walking idly about along the neighbouring roads, he got a supply of agricultural books, and made the more advanced boys read in them, and then he explained them, and examined the boys in what had been read and explained. This has been found productive of much good. It makes the boys take an interest in their work when on the farm, which they otherwise would not feel, and gives them more accurate habits of observation on the various materials around them. Their reasoning faculties are aroused, and they soon perceive the benefit of acquiring correct notions of farming, and quickly discern the reason why land improperly managed produces bad crops; and what changes and improvements are necessary to bring it into a proper state of cultivation. A pupil in one of the schools persuaded his father to follow the improved method in the growth and after-management of green crops, and the mangels and turnips raised by this man had such a healthy and promising appearance as to attract the attention of the agent of the landlord, and to lead him to make special inquiries as to what had effected such improvement this year compared with that of other years. Another boy belonging to an agricultural class caused his father to sow mangels in some ground he intended for potatoes; and afterwards the boy's father told the boy's instructor that he had made up a good part of his rent by the sale of some of the mangels, and fed pigs with the remainder of them; and was so highly pleased at having taken the boy's advice, that he said he would always contrive to sow as much as he could of this crop every year for the future. And in fact in many cases the agricultural pupils have directed the attention of their parents to the system pursued by their instructors, and induced them to adopt it to a certain extent, particularly in the cultivation of green crops.

This is another very important circumstance connected with the establishment of agricultural schools in Ireland, namely, the improvement thereby effected in the agriculture of the neighbourhood of the schools. When the people see a good crop of turnips grown on land where the like was never attempted to be grown before, they seem convinced of the importance of deep cultivation, and in some cases have at once followed the example thus afforded them, by trenching a certain portion of ground intended for green crops. In consequence of the practice pursued on the model farms attached to the schools, more attention has also been paid by the farmers of the neighbourhood to the house feeding of live stock; to the accumulation, preservation, and judicious application of manures; to the application of liquid manure to grass land, and to the cultivation of rape and winter vetches as a stolen crop for early spring feeding. What has conduced more to the march of improvement in these respects is the interest evinced by the neighbouring farmers when they observe that on a farm of small extent so many cattle are profitably supported throughout the year; a proportionably large quantity of farm yard manure yearly collected; a relatively increased amount of produce raised; and, at the same time, a regular order by which the various crops in the rotation follow each other on the farm. The prejudices of parents against allowing their children to work on the farm have also been removed by the improved appearance of the model farm, and many parents from the neighbouring parishes have sent their children to school, more for the purpose, as they have confessed, of obtaining agricultural than literary instruction. And some of them have afterwards acknowledged, that their sons had introduced many improvements which proved highly beneficial.

One other circumstance must be noticed which the Commissioners have mentioned in their Report, and which shows, as they observe, that their system of agricultural education is engaging attention and eliciting inquiry not only in Ireland but even beyond that country; and that their efforts for the improvement of Irish agriculture, through the medium of the national schools, are not only appreciated, but are about being adopted in Scotland. The Education Committee of the General Assembly of the Kirk of Scotland having requested the Commissioners to send one of their agriculturists over to Edinburgh, to explain the system of agricultural instruction carried out in Ireland, in connexion with the normal and common schools, they gladly acceded to the request, and not only sent over the agriculturist from the agricultural training school at Glasnevin, but also the teacher of the Larne agricultural national school and three of his pupils, in order that besides having the principles of their agricultural system explained in presence of the Committee, an opportunity might also be afforded of judging personally of its practical effects, as exemplified in the attainments of some of the pupils. The result of this examination was communicated to the Commissioners in two resolutions, in one of which the Committee thanked them for the ready and liberal manner in which they met their proposal; and in the other, they expressed their approbation of, and satisfaction with, the manner in which the agriculturist had fulfilled his mission, and the gratification afforded them by the visit of the teacher of the agricultural school and his three pupils, and by the proofs which a public examination of them afforded of the practicability of combining agricultural and literary instruction in elementary schools.

There are other particulars in the Report of the Commissioners to which we hope on another occasion to draw the attention of our readers.

Correspondence.

CERTIFICATES OF MERIT.

Sir,—The result of the late general examination at the Training Institutions has naturally led to some amount of discussion as to the appropriateness of the term *Certificate of Merit*. There are some few points in the matter which I feel desirous of bringing under the notice of your readers.

At the late Christmas examination our dozen training institutions for males, in connexion with the Committee of Council on Education, contained 438 students eligible for examination; that is, who had resided there one year or thereabouts; and the eight for females contained 272. Of this number of candidates, 64·6 per cent. of the males and 52·2 of the females were successful. Now, from these data it appears, that of the whole number of students 41·6 per cent., or nearly one-half, are not students of *merit*. They have during the year followed the same routine of duties as those who have merited the certificate, and in some cases possibly excelled their more fortunate companions in energy and application. Further, their conduct, religious and moral, has been such as at least to merit the esteem and approbation of the principal and officers of the institution. The regard that this demeanour, energy, and application have engendered in his mind, induces the principal to encourage the student to pursue his career, although he is not considered eligible for the certificate.

I think, however, you will concur with me when I say, that the "merit" (which I take to mean fitness for the performance of his duties) of a national schoolmaster cannot be fairly tested by the favourable results of a single year's training; and that practically there is great injustice in a system which awards distinction to one who shall have acquitted himself well at an examination, whilst it ignores altogether, or does not make allowance for that teaching power which is in reality the more valuable qualification, and which in many cases exists in a much higher degree in old masters who, not having had the same opportunities, have not the same expertness in technical knowledge, and have consequently failed to obtain the certificate.

There is great injustice in the system, because it sends home to his school many an old master whose spirit is broken and whose prospects in life are marred by his failure; whilst it gives to another a certificate of competency which he does not really possess, and frequently leads him to an arrogant reliance upon that certificate as a proof of his fitness.

We have not data in reference to masters from which to ascertain the rate per cent. of failures; but it may safely be stated to be far higher than for students. The following extract from the "Minutes" of last year throws some light upon the matter, inasmuch as it shows what it has been in one district. Mr. Blandford says:—

> "At Easter, 1851, an examination was held in Derby for the purpose of examining masters who were candidates for certificates of merit. Thirty-one presented themselves on that occasion, nine being masters of schools in my district; four of the latter were successful. I am not aware that any female teachers in the East Midland district presented themselves on the foregoing occasion; but if they did so, none were successful."

On looking through the lists of successful candidates at the late examination, every one must be struck with the very high certificates of merit awarded to young students who at present have had little or no experience in teaching—have never at least had charge of a school. They may have exhibited attainments, by their answers to the examination papers, superior to the general run of masters; but it should be borne in mind that those papers have been framed to meet the acquirements of the students, or, what amounts to the same thing, the student has been trained to meet the special requirements of the papers.

A TRAINED CERTIFICATED MASTER.

TRANSLATIONS OF THE CLASSICS.

ON the subject of Translations of the Classics, I think that it should be remarked, that their use and abuse is by no means confined to boys; and that some of those who direct education at a more advanced age, are responsible for not properly sifting their pupils' knowledge so as to make it clear to them that a " crib " is but a broken reed. I have heard of a man of considerable university eminence, who encouraged his class to render Sophocles line by line into blank verse; thus comfortably wrapping up all difficulties of construction (and where are there more?) in a few sounding words. You have justly observed that blank verse is the proper English equivalent for the Iambic; but this does not render its manufacture desirable at lecture. I may say, from my own experience, that at some establishments of great pretension, this sort of looseness is carried so far, that a picked man, who supposes himself to have read great part of Thucydides and Sophocles shall not construe grammatically three lines of ordinary difficulty. I may also say, that this tendency may be easily checked by requiring an oral translation word by word, and not in portions of a line or so, as, by a sort of compromise between tutor and pupil, is frequently permitted. It is also good to be satisfied with a moderate portion well done, and not to let pupils make " *non bene sed multum*" their principle of action. Any one who has honestly tried to master the difficulties of the two Classics I have named, knows that it is not easily or hastily done.

It is scarcely necessary to remark, that our present translators have souls far above particles; or else it is that this refinement " cannot be done at the price." To show in detail that they are inaccurate would be holding a candle to the sun. Their notes are concocted, like Anthon's, by simple copying from earlier writers, and, by a singular perversity, usually from the most obscure and injudicious. After all that has been done of late to supply good books of reference, it is surely needless to quote from a commentator who makes the habits and mode of life of Apollo as much a matter of fact as those of the Duke of Wellington, and gives particulars of Faunus and Sextius as if there were equal historical authority for both. I refer to a translation of Horace in Mr. Bohn's Classical Series. He takes his text literally, and turns an allusion to a custom or tradition into a plain prosaic fact; which, having been derived by him from the author, is presently quoted to explain the author. Thus I suppose the words " Quam Venus arbitrum dicet bibendi" were his only authority for saying, p. 7, n. 32, that an image of Venus was painted on the die. At p. 46 is a note extracted from Anthon, giving the usual explanation of the same words, which is inconsistent with the former.

Your correspondent regrets the extent to which Anthon's books have been used; but it surely is the fault of English scholars that these or worse editions have so long held place; and to dismiss them it is requisite first to write books, of which we have lately some excellent examples, and then to get schoolmasters to use them. H.

NURSES' GRAMMAR.

Sir,—Allow me to say a few words upon what I believe to be a very common practice of English nurses, and perhaps of some mothers; I mean that of speaking deliberately bad English to the children of whom they have charge. I only lately heard, in a public conveyance, a decently dressed woman keeping up a running conversation with a little boy on her knee, of which some of the sentences were as follows: "Johnny don't like riding such a long way in the omnibus; *do* he? When we *gets* home we'll have a nice cup of tea; won't us, Johnny?" Yet I observed that this woman spoke with the most perfect grammatical correctness when she turned from the child to address a grown-up person at her side. I have noticed the same kind of thing several times. It is difficult to say whether nurses and mothers consider this as a kind of condescension to the child, a meeting it half way in the mistakes which they think it will probably make when it first attempts to speak its vernacular; or whether it is that they find it a relief to themselves occasionally to relax from the severity of speaking good grammar; or whether they fancy that there is something tender, conciliatory, and endearing, in thus sacrificing Murray for their children's sake: but we cannot be surprised, when children are taught "to lisp in blunders, if the blunders come."

I am, Sir, yours truly,

B.

ANSWERS TO THE MATHEMATICAL QUESTIONS.

Ques. 163.—*Proposed by Mr. T. T. Wilkinson, Burnley.*

A gentleman in Burnley has recently purchased a number of ground-rents, producing 76*l.* per annum, and having forty-three years to run, for 1200*l.* What rate of interest does he obtain for his money?

Answered by Amicus and Mr. William Godward, jun.

The present value of 1*l.* per annum for forty-three years is $\frac{1200}{76} = \frac{300}{19} = 15{\cdot}7095$*l.*, and by Rance's Tables, which are given to every ¼ per cent. from ¼ to 10 per cent., we at once see that the required rate lies between 5¾ and 6 per cent., for, by the tables, the present value of 1*l.* per annum for forty-three years at 5¾ per cent. is 15·8199*l.*, and at 6 per cent. it is 15·3062*l.* To obtain the correct rate we proceed thus:

$$\begin{array}{rcrcccc} 15{\cdot}8199 & & 15{\cdot}8199 & & & & \\ \underline{15{\cdot}3062} & & \underline{15{\cdot}7095} & & & & \\ 5137 & : & 1104 & :: & \frac{1}{4} & : & {\cdot}015\,; \end{array}$$

hence, $5{\cdot}75 + {\cdot}015 = 5{\cdot}765 =$ 5*l.* 15*s.* 3½*d.*, is the rate per cent. required.

Mr. Levy and Mr. Wilkinson bring out the same result by a formula in Art. 72 of Bailey's "Doctrine of Interest and Annuities."

Ques. 164.—*From Pott's School Euclid, communicated by a Correspondent.*

"In the base BC of an isosceles triangle ABC, take a point D, and in CA take CE equal to CD, let ED produced meet AB produced in F; then $3\angle$ AEF = 2 right angles + $\angle$AFE, or = 4 right angles + $\angle$AFE," according as the vertical angle is greater or less than two-thirds of a right angle. Required, demonstrations of both cases.

Answered by E′ and Messrs. Levy, Mansford, Rutter, and Wilkinson.

Case 1.—When the vertical angle is greater than two-thirds of a right angle, DE and BA either intersect or meet above the vertex, and π + AFE = BAC + 2 ABC + AFE = AEF + 2 ABC + 2 AFE = AEF + 2 EDC = AEF + 2 DEC = 3 AEF.

Case 2.—When the vertical angle is less than two-thirds of a right angle, ED and AB meet below the base, and 2 π + AFE = 2 BAC + 4 ABC + AFE = 2 BAC + 3 ABC + BDF + 2 AFE = 2 DEC + BDF + 3 ABC = 3 (CDE + ACB) = 3 AEF.

QUES. 165.—*From the Senate House Problems for* 1852, *proposed by request of a Correspondent.*

Prove the truth of the formula—

$$2(\sin^6\theta+\cos^6\theta)-3(\sin^4\theta+\cos^4\theta)+1=0.$$

Answered by Mr. John Godward, Chelsea.

$$\begin{aligned}\text{Since } \sin^6\theta+\cos^6\theta &= (\sin^2\theta+\cos^2\theta)(\sin^4\theta-\sin^2\theta\cos^2\theta+\cos^4\theta)\\ &= \sin^4\theta-\sin^2\theta\cos^2\theta+\cos^4\theta\end{aligned}$$

$$\begin{aligned}\text{we have } 2(\sin^6\theta+\cos^6\theta)-3(\sin^4\theta+\cos^4\theta)+1 &= 1-\sin^4\theta-2\sin^2\theta\cos^2\theta-\cos^4\theta\\ &= 1-(\sin^2+\cos^2\theta)^2\\ &= 0.\end{aligned}$$

Second Solution by Messrs. Mansford, Lovell, A.M., and E′.

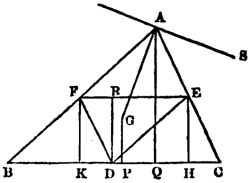
$$\begin{aligned}&2(\sin^6\theta+\cos^6\theta)-3(\sin^4\theta+\cos^4\theta)+1\\ &=2\left\{\sin^6\theta+(1-\sin^2\theta)^3\right\}-3\left\{\sin^4\theta+(1-\sin^2\theta)^2\right\}+1\\ &=2-6\sin^2\theta+6\sin^4\theta-6\sin^4\theta-3+6\sin^2\theta+1\\ &=0.\end{aligned}$$

QUES. 166.—*From the same, communicated by Mr. W. H. Levy.*

A uniform rod of length l is cut into three portions, a, b, c, and these are formed into a triangle; when the triangle is placed in unstable equilibrium, resting with its plane vertical, and one of its angular points upon a smooth horizontal plane, find the angle which the uppermost side makes with the horizon; and show that if α, β, γ be the three angles corresponding to the several cases of a, b, c, being the uppermost side, then

$$(l+a)\tan\alpha+(l+b)\tan\beta+(l+c)\tan\gamma=0.$$

Answered by Amicus, Mr. W. H. Levy, and Mr. Wm. Godward, jun.



Let D, E, F be the middle points or centres of gravity of the sides BC, CA, AB, and G the centre of gravity of the perimeter of the triangle ABC. Join DE, EF, FD, AG, and draw FK, DR, GP, AQ, EH perpendicular to BC. When the triangle is in unstable equilibrium, resting with the angle A on the plane AS, then AG is perpendicular to AS, and therefore the angle GAQ = α. Now AQ = $\dfrac{rl}{a}$, and DQ = $\dfrac{c^2-b^2}{2a}$; also by similar triangles F R = $\frac{1}{2}$ QC = $\frac{1}{2}b\cos$ C, RE = $\frac{1}{2}$ BQ = $\frac{1}{2}c\cos$ B, and EH = FK = DR = $\frac{1}{2}$ AQ = $\dfrac{rl}{2a}$.

Therefore by mechanics (Tate's Mechanical Philosophy, art. 92),

$$\begin{aligned}\text{DP} &= \frac{b.\,\text{RE}-c\cdot\text{RF}}{l}=\frac{lc}{2l}(\cos\text{B}-\cos\text{C})=\frac{bc}{l}(\cos^2\tfrac{1}{2}\text{B}-\cos^2\tfrac{1}{2}\text{C})\,\}\\ &= \frac{bc}{l}\left\{\frac{\frac{1}{2}l(\frac{1}{2}l-b)}{ac}-\frac{\frac{1}{2}l(\frac{1}{2}l-c)}{ab}\right\}=\frac{b(\frac{1}{2}l-b)-c(\frac{1}{2}l-c)}{2a}\\ &= \frac{c^2-b^2-\frac{1}{2}l(c-b)}{2a}.\end{aligned}$$

$$\text{And GP} = \frac{b.\text{EH} + c.\text{FK}}{l} = \frac{rl}{2a} \times \frac{b+c}{l} = \frac{r(l-a)}{2a}.$$

$$\therefore \text{DQ} - \text{DP} = \frac{l}{4a}(c-b), \text{ and AQ} - \text{GP} = \frac{r(l+a)}{2a};$$

$$\text{hence } \tan\alpha = \tan \text{GAQ} = \frac{\text{DQ}-\text{DP}}{\text{AQ}-\text{GP}} = \frac{l(c-b)}{2r(l+a)}$$

$$\text{or } (l+a)\tan\alpha = \frac{l}{2r}(c-b).$$

$$\text{Similarly } (l+b)\tan\beta = \frac{l}{2r}(b-a), \text{ and } (l+c)\tan\gamma = \frac{l}{2r}(a-c)$$

$$\therefore (l+a)\tan\alpha + (l+b)\tan\beta + (l+c)\tan\gamma = 0.$$

LIST OF MATHEMATICAL ANSWERS.

Amicus, ans. 163, 164, 165, 166; J. O. C., Seaham, ans. 164; E′, Great Stukeley ans. 164, 165; John Godward, Chelsea, ans. 164, 165; William Godward, jun, Chelsea, ans. 163, 164, 165, 166; W. H. Levy, Shalbourne, ans. 163, 164, 165, 166; J. Lovell, ans. 165; A. M., ans. 163, 164, 165; Charles Mansford, Westminster, ans. 164, 165; Edward Rutter, Sunderland, ans. 164, 165; T. T. Wilkinson, Burnley, ans. 163, 164; and Z., Leeds, ans. 164.

NEW QUESTIONS,

To be answered in our Number for May, 1853.

Ques. 167.—*Proposed by Mr. W. H. Levy, Shalbourne.*

If the base of any plane triangle be equal to half the sum of the other two sides, then will the perpendicular on the base from the opposite angle be equal to three times the radius of the inscribed circle.

Ques. 168.—*Proposed by Mr. John Smith, Manchester.*

$$\left.\begin{array}{l}\text{Given } x^2 + y^2 = a^2, \\ \text{and } x \sin\alpha + y\cos\alpha = a\sin\beta.\end{array}\right\} \text{ to find } x \text{ and } y.$$

Ques. 169.—*Proposed by Amicus.*

Find the value of x corresponding to the maxima or minima values of

$$2x^3 - 3(a+b)x^3 + 6abx + c;$$

and distinguish the maxima from the minima values.

Ques. 170.—*From the Senate House Problems for* 1852.

A string nine feet long has one end attached to the extremity of a smooth uniform heavy rod two feet in length, and at the other end carries a ring which slides upon the rod. The rod is suspended by means of the string from a smooth peg; prove if θ be the angle which the rod makes with the horizon, that

$$\tan\theta = 3^{-\frac{1}{3}} - 3^{-\frac{2}{3}}.$$

We agree with W. C. H. of Tottenham, in his correction of the solution to Question 150. The momenta of the ball and cannon should be equated, and not their accumulated works, as the pressure acts through equal times, and not through equal spaces. The velocity of recoil should be $\frac{5}{7}$, or ·714.

⁂ It is particularly requested that all mathematical contributions be forwarded, at *latest*, by the 20th of each month.

SUGGESTIONS ON THE CULTIVATION, MANAGEMENT, AND PRESERVATION OF THE VOICE.

(*Continued from p.* 102.)

[The following remarks, addressed to Clergymen, have been published in *The English Churchman*. We extract them as being useful and suggestive to Masters.]

WE proceed to consider in their order the other organs of the voice.

The trachea is the pipe which conveys the wind to the larynx. It seems to be admitted that alterations of this pipe affect the voice. This is another reason for keeping the chest as uniformly full as possible; for, when the chest is empty, the position of this pipe must alter.

The larynx is a box composed of cartilages; it contains the glottis or vibrating plates. The upper part of it forms the first portion of the tube of sound, and is capable of varying its size to suit the extent of the vibrating cord. It is here that voice is produced. Its mechanism is most curious; but we do not enter into it, because here physiology ceases to be a practical guide. A knowledge of the way in which the muscles ought to act is useful only when the action of those muscles is cognizable by our senses. Now it is true that there is a sense by which we can judge of the position of muscles and nerves, irrespective of the fine senses commonly recognised; and by this sense it is quite possible to be conscious of the position of the larynx. But this sense becomes active only by long cultivation; the young reader cannot use it. But nature has given us an imitative power of copying the sounds we hear, and by such efforts we acquire the power of putting unseen muscles in the position we require. The reader must copy a good model to put the muscles of the larynx in a right position for reading. The writer is deeply sensible from his own experience that, for this purpose, nothing is equal to intoning. The writer has never intoned the Service, and perhaps may never do so: he therefore feels more at liberty to speak of it. He knows well that there is no way like this for finding the true position of the larynx. Of course we may "intone" without gaining this, and some do; yet it is certainly the easiest and surest way of gaining it. The reason, perhaps, is, that we have a greater power of imitating appreciable than inappreciable sounds: the former are those which vary by distinct and natural intervals—*i. e.*, the notes in a musical scale; the latter, those which vary by arbitrary intervals, which have no natural limits fixed. Hence we copy the varied notes of a song more easily than the various modulations of a speaker. Intoning seems to train the voice thus; we copy a clear musical note, which is easily copied; thus we get the organs of the larynx in a right position. We learn also to end with a note a minor third above; the preparation for this sustains the note all along; it trains not only the muscles of the larynx, but the muscles of the chest also. It is true we do not often hear intoners read well, but that is simply because they never dream of applying to reading what they have learned in intoning. Let the reader only try to intone in private, so far as to feel the position of the organs which enable it to be done; then, when he goes to read in public, let him try and *think* that he is going to intone; let him almost begin as if he was intoning, and let him try to preserve that position of the organs of voice, and he will soon learn to use those organs right in public reading; he will distinguish by an internal sense of feeling (after some little time) that the organs of the larynx are in a quite different position from what they used to be in when he read; he will find himself acquiring a clear, far-reaching voice, which requires far less expenditure of breath than he was used to before. The writer of this has long tried it, and with success; and, after long thought, he has not been able to find any other way by which he could direct another person to put his larynx in a right position for public reading.

This may lead a reflecting person to think that the practice of intoning has more foundation in nature and reason than it sometimes gets credit for. When rightly performed, it certainly has the effect of filling a large space with a distinct sound, with the smallest expenditure of breath. The same thing *may* be accomplished in reading, but it is certainly much more easily attained in learning to intone. Those readers who object to such "singing" are seldom sensible that they "sing" much more themselves in reading. The intoner uses but two notes, they use perhaps three or four; the intoner uses his notes in uniform places in sentences: so do they; the intoner places the notes so as to please the ear: they place them so as to disgust the ear, and outrage the sense and feeling of the mind; the intoner's sentences are heard with distinctness to the end, and theirs are not. Such are the comparative merits of the two "songs." The writer, for himself, prefers really good and perfect reading, as being superior in the natural power of expression; but he knows no way of attaining to the right use of the voice in public reading equal to that of practising intoning in private. In some cases, it may prove the only remedy for inveterate habits; and it is worthy of the consideration of medical men who may have to deal with diseases of the organs of voice induced by such habits.

Most voices are capable of producing several notes in the musical scale. These notes vary in their degree of strength; the middle notes are louder, clearer, and more perfect than the extremes, and are produced with greater ease. There is in every voice one note which is the fittest for reaching to a distance, and filling a large space. It is of great importance to a reader to find the best note of his voice. In general this note is a higher one than that which is used in reading. The difficulty of sustaining the note, which arises from bad method, induces the necessity of using too low a note, and even this sinks to a lower at the end of each sentence. Any one may observe that, where the latter part of the sentence is given in a lower note, it is never as well heard at the former part, and often not heard at all. Many readers give nothing but half sentences to their hearers. This is a further proof of the necessity of a sustained tone; and it should also lead us to acquire that tone which is fittest for the purpose. As we have said, it will generally be a higher one than the one we have been used to; and to acquire this tone, and still more to sustain it, will require patient and diligent training; but the result will be great ease to the reader, and advantage to the people. He who "reads in his throat" is disgusting his people with the public service of God, and laying the foundation of disease for himself. This reading in the throat is nothing else but reading with the organs of the larynx in a wrong position. The method we have recommended is an effectual remedy, and the only one we know.

The lips of the glottis being the vibrating plate or reed of the human organ, the cavity of the upper part of the larynx and of the mouth, to the lips, is the tube which gives character and sublimity to the sound. The length and breadth of this tube are variable, to suit the conditions of the vibrating plates. The lips protruded or drawn back, and the larynx raised or lowered, affect the length. The contraction of the larynx, and the position of the tongue and lips, affect the breadth.

The wide bell-mouth of the clarionet increases its sound considerably; an opposite form would greatly diminish it. Here is an available mode of increasing the power of the human voice, without any increased exertion of the chest or throat. The speaker may add greatly to the power of his voice by simply opening his mouth wide. It is a very common question with public readers who are anxious to improve, "Should I speak from my chest or my lips?" The answer is, "If you want to speak distinctly to a large assembly, you must use both your chest and your mouth, and each in due proportion to the other; and you must especially guard against relying on the chest for what the mouth alone can do; and you must further economise the power of the chest for its own proper office."

The chest and the throat can produce *vowels only*. These are properly "sounds." Consonants are not sounds in themselves; they are only inflections given to sounds as they pass out through the mouth. It is the tongue, the teeth, the palate, the nasal passages, and the lips, that produce these inflations, and the chest and throat can give no assistance towards producing them.

Has it ever occurred to our readers to consider where the failure lies, when a reader or preacher is not heard in church? *Is it in the vowels or the consonants?* This is a very important question. The failure is almost always in the consonants. It rarely or never happens that those most unfavourably placed in a church hear no sound from the speaker's voice. They hear a noise, but it has no distinct signification. The noise is loud enough, but it conveys no meaning. In this case the vowels are effectively produced, or no noise would be heard. But the inflections are not produced sufficiently to accompany the sound as far as it goes. The consonants are so imperfectly produced that the character impressed on the vibration wears out before the vibration itself ceases. How common is it to hear the reader's voice thus: "O—au—o—ou—ou—e—." This is, "O Lord, open Thou our lips,"—the vowels only, without consonants. When the reader is told, "I don't hear you where I sit," he exerts his chest with greater force, and roars out these vowels; and then people say, "I can't hear Mr. So-and-So, he speaks so loud."

Now, since the vowels were heard distinctly in the first instance, there is no additional force required in the vowels, and therefore no additional action of the chest. The reader who adopts this remedy is only killing himself, without making matters better. If he would but learn to use his tongue and lips, &c., so as to give each vowel an impression which would continue in the vibration, as far as the vibration itself extended, he would be distinctly heard, or, rather, the meaning of the noise he makes would be gathered, as far as the sound of his voice extends. It is *distinct articulation* that is required; that is, correct and perfect formation of the different positions of mouth required to give certain inflections to the sound. All the muscles that move the lips and tongue, &c., have to be trained for this work. The movements of the tongue and lips, which give sufficient inflection to faint sounds, will not suffice for strong and loud sounds. Such weak impressions will wear out before the sound itself has reached half its length.

The different vowels are produced by different shapes of the tube, the shape continuing so far the same during the emissions of the vowel. The other inflections, called consonants, are produced by altering the shape of other parts of the tube during the emission of the vowel. Thus A is formed through an open tube; E through a tube narrowed by the tongue; O by protruded lips and a circular opening, &c., this form continuing while the vowel is sounded. B by lips tightly and suddenly closed or opened. P by the same closing, less forcibly and more gradually. Let it be remembered that the mouth must be much more widely opened to give a loud sound. There must be proportionate action of the lips to make the closure perfect. If this be not done, those consonants will not be heard, while the vowels will be heard. D is formed by closing the tube with the tongue round the interior of the upper gum. T by the same form, with a similar variation as in B and P. Now, in keeping the mouth wide open, the tendency is always to make these closures more imperfectly than in ordinary conversation, whereas they ought to be made more perfectly, to impress the character on a greater volume of sound. Increased action of the chest will do nothing towards this, but will probably still further hinder its being done. Whenever the *sound* of the reader's voice is heard, but the meaning not distinguished, the remedy is to be sought for here. Distinct articulation and an open mouth is the proper relief for a weak chest, and the proper means of husbanding the supply of the chest, so as to have always a full supply of breath at command. And, for this purpose, the muscles of the lips and tongue must be brought into full and perfect action, by careful training.

If any of our readers wish to see a perfect specimen of this use of the muscles of the mouth, let them spend an hour in the sales-rooms of some of our great auctioneers. These men have to speak for many hours each day,—often seven or eight hours. They have to speak incessantly, and to do it so as to be heard above the continual buzz of a multitude of voices. The feeble reader, when he considers their incessant labour, wonders they are not dead long ago. He thinks one week of such exertion would put him in his grave. And so it would, if he did not adopt the auctioneer's method of speaking; and the auctioneer would have been in his grave long ago if he had followed the reader's method.

Some of these men afford perfect specimens of a well-practised voice. The figure erect, the shoulders back and depressed, the chest full, the lips never protruding, but lying close upon the teeth, to shorten the tube for that high sharp voice that penetrates everywhere, and that no noise can drown. And the wonderful action of the lips, the wideness of the openings and the perfection of the closures, by which every syllable and consonant is perfectly formed—the very development of the muscles of the lips from long training would lead an attentive observer to detect their calling if he met them in the street. It is a lesson not to be despised. These men learn it for success in an earthly calling: and is it unworthy our pains to learn it, that we may give animation to the prayers and praises of the Church, and effect to Christ's ordinance of preaching the Gospel, in which we hope to win our crown?

A PASSAGE FOR DICTATION.

"There are other books besides the Bible, which combine unity of design with variety of detail. 'The Pilgrim's Progress' of Bunyan may be cited as a familiar, yet happy example of a work which delights the reader with much diversified instruction, without sacrificing oneness of purpose and plan. But the Bible occupies in this, as in other respects, a position altogether unique and peculiar. The Bible, observe, is not one book, but a collection of sixty-six different books. It is the production, not of one writer, but of thirty-six different writers—men of every diversity of rank, talent, and mental culture—from the monarch to the gatherer of sycamore fruit, from the accomplished pupil of Gamaliel to the unlettered fisherman of Galilee. It is a work, moreover, not of one age, but of many and distant ages. The opening books date six hundred years earlier than any other literary composition extant, while the closing book is a production of the age of the Cæsars; the whole is the connected literature of a period not short of fifteen centuries. Then how various are the books in kind. Some are histories; some, biographies; some, poems; some, digests of public law; some, collections of national proverbs; some, epistles to churches; some, private letters to friends. Nor are their subjects less diversified than the dates and the authors. Instead of discussing only one or two points, they discuss a thousand—and these the most profound and perplexing within the whole range of human inquiry, the most unfavourable to unity of sentiment, the most vexed by controversy and debate. Now, certainly it never could have been expected beforehand, on any ordinary grounds of probability, that a series of works, open to so many sources of diversity, should exhibit such a thing as uniformity of sentiment or congruity of design. The analogy of all other instances in the history of literature, would have led us to anticipate the utmost diversity of doctrine, no less than of style and execution. Anything like a systematic unity of thought and purpose would have been pronounced impossible. Nevertheless, the perfect doctrinal agreement of the sacred books is one of their most indisputable properties. The Scripture authors, though living in ages very distant from each other, and writing under circumstances as dissimilar as can well be imagined, are not only entirely at one on all the subjects which they touch, but undesignedly contribute, each his contingent, towards the completion of a magnificent UNITY."—M'CULLOCH's *Literary Characteristics of the Holy Scriptures.*

GENERAL EXAMINATION OF TRAINING SCHOOLS.

CHRISTMAS, 1852.

(*Continued from p.* 108.)

FEMALES.

HOLY SCRIPTURE.

SECTION I.—1. Give a brief account of the life and character of Samuel.

2. What relations of Moses are mentioned in Holy Scripture? Describe the characters of his brother and sister.

3. Name the kings of Judah, from Rehoboam to Jehoshaphat, and the chief events in the reign of each.

4. In what respects did the second temple differ from the first? Describe the feelings of the Jews on its restoration.

5. Give instances of intercessory prayer, of solemn praise and thanksgiving, from the Old Testament.

SECTION II.—1. Give texts and examples from Holy Scripture to show the difference between *true*, *feigned*, and *imperfect* repentance, and state exactly the Scriptural meaning of the word.

2. Quote the most important prophecies which intimate the Divinity of the Messiah.

3. Show, from prophecy, that the Jews ought to have expected that the Gentiles would be admitted into the Church of Christ.

SECTION III.—1. Show the fulfilment of prophecy in the events of our Lord's birth and infancy.

2. What parables are related by St. Luke alone? Explain one of these parables.

3. Which of the Apostles were selected by our Lord to be witnesses of his transfiguration? On what other occasions were they thus chosen?

4. Give an account of the events narrated in the Acts of the Apostles between Pentecost and the conversion of Saul.

5. Describe the first journey of St. Paul with Silas.

SECTION IV.—1. Quote texts from the Epistles of St. Paul and St. Peter which refer to the duties of subjects, servants, and masters. Illustrate these texts by examples from Scripture history.

2. Quote the chief texts in the Old and New Testament which refer to the education of children, and give examples of the effects of good and bad training.

3. Explain the meaning of the words atonement, propitiation, redemption, and justification, with texts.

4. Which epistles speak most fully of the resurrection of the dead, and the second coming of our Lord? Quote the chief passages.

SUPPLEMENTARY QUESTIONS.

1. What period of time elapsed between these events: the creation, flood, call of Abraham, the Exodus, building of temple, restoration of Jews, birth of our Lord? Name the chief events of the last interval.

2. Trace the progressive revelation of a future state, in the Old Testament.

3. Show the fulfilment of prophecies relating to the posterity of Japhet, Ishmael, and Esau.

4. What are the spiritual characteristics of Messiah's people, as described in prophecy?

5. Against what nations did Nahum, Obadiah, and Ezekiel prophesy? Show the fulfilment.

6. What books of Holy Scripture are illustrated by the monuments of Egypt and Nineveh? Give some instances.

7. Show the extent of St. Paul's labours, from the Acts and Epistles.

8. Give an analysis of the Epistle to the Galatians.

9. Compare the arguments employed by St. Paul in addressing Gentile and Hebrew converts.

CATECHISM, LITURGY, AND CHURCH HISTORY.

SECTION I.—Prepare the notes of a lesson on one of these subjects:—

Duty to Parents.
The Baptismal Covenant.
Preparation for the Lord's Supper.

SECTION II.—1. What portions of the Old Testament are appointed for the Lessons in Advent, Lent, and Easter? Why do these portions appear to have been selected?

2. For what days of the year are Proper Psalms appointed? Show the propriety of the selection for any two occasions.

3. Of what subjects does the preface to the Prayer Book treat? What does it state concerning the use and abuse of ceremonies?

SECTION III.—State the doctrine of our Church, as expressed in the Articles, on one of these subjects, with Scriptural Illustrations:—

Original Sin.
Sin after Baptism.
The Lord's Supper.
The Sacrifice of Christ.

SECTION IV.—1. What persons were engaged in the compilation of the first English Prayer Book? In what points did it differ from the second?

2. Name the martyrs in the Marian persecution, and give an account of Bishop Ridley.

3. When did these persons flourish, and for what were they severally remarkable—Archbishops Usher, Grindall, Leighton; Bishops Hall, J. Taylor, and Wilson?

SUPPLEMENTARY.

1. Name the chief ecclesiastics of the British and Anglo-Saxon period? On what points can any of them be shown not to have held Romish doctrines?

2. Give some account of Lanfranc, Anselm, and William of Wykeham.

3. Give some account of Papias, Polycarp, and Irenæus.

4. On what occasion was the famous letter of Pliny written? What does it prove of the doctrines and customs of primitive Christians?

5. What general councils are recognized by our Church? On what occasions were they severally held?

6. Show from history the gradual encroachments of the Papacy between the 10th and 16th centuries.

GEOGRAPHY AND NATURAL HISTORY.

Section I.—1. Draw an outline map of Scotland, or of Ireland, inserting the names of the sea-ports and rivers.

2. Where are these places situate, and for what are they remarkable—Chatham, Plymouth, Falmouth, Sunderland, Sheffield, Paisley, Belfast, Drogheda?

3. Name the British possessions in Europe, North America, and the West Indies. Describe the climate and productions of the West Indian Islands.

Section II.—1. Name the islands adjoining Great Britain, and give some account of the most northerly.

2. Name the lakes of Great Britain, and describe the largest in England, Scotland, and Ireland, respectively.

3. Enumerate the chief imports and exports of Great Britain, and give some account of their value and importance.

Section III.—1. Draw an outline map of one of these countries, inserting the names of the chief cities and rivers;—France, Italy, or Austria.

2. Name the six largest rivers of Europe, with the length of each; and describe accurately the course of the Danube.

3. Name the chief mountains, lakes, and cities of Switzerland, and give some account of the glaciers.

Section IV.—1. Draw a map of Palestine, and describe briefly the climate, and chief physical features.

2. Where are the following places situate: Astrachan, Samarcand, Hamadan, Philadelphia, Breslau, Toronto, Funchal, Mocha, Benares, Singapore, Aden?

3. Compare the heights of the mountains of England, Europe, South America, and Asia. Describe the scenery and climate of one group or chain of these mountains.

SUPPLEMENTARY PAPER.

1. Describe generally the mountain system of the old world.
2. Which are the chief Asiatic plains? Describe the Steppes.
3. Describe the tide waves of the Indian and Atlantic Oceans.
4. Describe the causes and effects of periodical rains. Compare the relative quantity of rain in different regions of Europe and Asia.
5. What causes determine physical climates? Illustrate each cause by reference to the map.
6. Give some account of the formation and appearance of coral islands.
7. Upon what law does the distribution of animals mainly depend? Enumerate the chief herbivorous mammalia, and name their localities.
8. What are the chief classes of plants? Name the zones of vegetation.

ENGLISH HISTORY.

Section I.—1. Name the chief events in the reign of John.

2. Give the dates and result of these battles—Falkirk, Bannockburn, Evesham, and Bosworth.

3. Describe the character of Queen Elizabeth and the chief events in her reign.

Section II.—1. What circumstances led to the accession of George I.? Trace his descent, and describe his character.

2. Give an account of the rebellion of 1715.

3. What foreign princes were contemporaries with George I.? Enumerate the chief events of his reign.

Section III.—1. What were the chief events during the reign of Queen Anne?

2. Give an account of the events that followed the retreat of Charles Edward from Derby, until his escape to France.

3. Give an account of the expedition of General Wolf, in 1759.

4. What names in art, science, and literature are most distinguished in the reign of George I. and II.?

SECTION IV.—1. Describe the death of Lord Chatham.

2. Describe the events (with dates) which led to the independence of the United States of North America.

3. Describe the character of Louis XVI. Name the chief actors in the French revolution.

4. Give an account of the slave trade, as it occurs in English history.

5. What battles were fought by the Duke of Wellington in the Peninsula? Give an account of one of these battles.

SUPPLEMENTARY.

1. Give a brief account of the customs and political institutions of the Anglo-Saxons in the ninth century.

2. When was the feudal system introduced? What were its chief characteristics?

3. Enumerate the inventions and discoveries since the fifteenth century which have had most effect in promoting the civilization of England.

4. Compare the domestic habits of the gentry, or of the peasantry, in the reigns of Elizabeth, James II., George II., and Victoria.

5. Enumerate the temporal benefits of the Reformation.

6. With what portions of English history are the following names associated—Philip Augustus, Francis I., Charles V., Henry IV., Richelieu, Prince Eugene, Louis XIV.?

ENGLISH GRAMMAR, LANGUAGE, AND LITERATURE.

SECTION I.—Write a paraphrase of one of the following passages, expressing the sense of each sentence in clear and simple prose:—

1. As thus the snows arise, and *foul*, and fierce,
All winter *drives* along the darken'd *air;*
In his own loose *revolving* fields, the swain
Disaster'd stands; *sees* other hills *ascend,*
Of unknown, joyless brow; and other *scenes,*
Of horrid prospect, shag the trackless plain:
Nor finds the river, nor the forest, *hid*
Beneath the formless *wild;* but wanders on
From hill to dale, still more and more *astray,*
Impatient flouncing through the drifted *heaps,*
Strong with the thought of home; the thoughts of home
Rush on his nerves, and call their vigour forth
In many a vain attempt.—THOMSON.

2. How soon hath *time*, the subtle *thief* of youth,
Stol'n on his wing my three and twentieth *year!*
My *hasting* days fly *on* with full career,
But my late Spring no *bud* or blossom sheweth.
Perhaps my semblance might deceive the truth
That I to manhood am arrived so near;
And inward ripeness doth much less appear,
That some more *timely happy spirits endu'th.*
Yet *be* it less or more, or soon or slow,
It shall be still in strictest measure even
To that same lot, however *mean* or high,
Towards *which* time leads me, and the will of Heaven.
All is, if I *have* grace to use *it* so,
As ever in my great *Task-master's* eye.—MILTON.

SECTION II.—1. Parse the words printed in italics.

2. Analyse and explain the construction of the passage beginning "As thus," and ending with "the trackless plain."

SECTION III.—1. Enumerate the various plural forms of nouns. Account for these forms—loaves, chiefs, kine, alms, pence, mice.

2. Classify the irregular verbs according to their forms.

3. Show the various modes by which nouns are formed from verbs.

4. Enumerate the derivative forms of adjectives, with the general meaning of each form.

SUPPLEMENTARY QUESTIONS.

1. Give the meaning and derivation of these words—beadle, burgess, Bradburn, Copenhagen, dawn, Snowdon, farewell, frog, gooseberry, Stonehenge, leasing, shire, Wales.
2. From what languages are these words derived, and how?—article, rebel, cadence, indented, docile, superfluous, horizon, elapse, mortify.
3. Enumerate the principal figures of syntax and rhetoric, with an example of each.
4. Explain the metre of these lines:—

My right there is none to dispute.
I can fly, or I can run
Quickly to the green earth's end.

Give examples of other principal metres used by English poets.

5. Who were the chief Anglo-Saxon writers? What is meant by Middle English? Give an example?
6. When did the following writers flourish? name the principal works of each:—Chaucer, Spenser, Addison, Pope, Thomson, Burke.
7. Give an analysis of any one great poem in the English language.

ARITHMETIC.

Section I.—1. Find the value of 907 articles at 1*l.* 17*s.* 6¾*d.* each.

2. What will be the rent of a house for 3 months, 2 weeks, and 4 days, at 4*l.* 14*s.* 6*d.* per month?

3. What will be the cost of painting a room at 1*s.* 6¼*d.* per square yard, whose height is 11 feet, width 15 feet, and length 18 feet 6 inches?

Section II.—1. How much sugar can be bought for 11*l.* 5*s.*, if 8 cwt. 3 qrs. 21 lbs. cost 4*l.* 9*s.* 4½*d.*?

2. If 4¼ yds. of silk cost 1*l.* 11*s.*, what will be the cost of 40⅞ yards?

3. If 30 cwt. are carried 15 miles for 5*l.* 8*s.* 9*d.*, how far ought 80 cwt. to be carried for 29*l.*?

Section III.—1. Find the interest on 608*l.* for 3 years, at 3*l.* 7*s.* 9¼*d.* per cent.

2. If tea be purchased at 2*s.* 9*d.* per lb., and sold at 3*s.* 4*d.*, what is the gain per cent.?

3. At what rate will the interest on 102*l.* 10*s.* amount to 12*l.* 13*s.* 8¼*d.* in 2¾ years?

Section IV.—1. Explain the terms numerator, denominator, proper and improper fractions, and reduce ¼, ⅜, $\frac{5}{15}$, $\frac{2}{15}$, to their least common denominator.

2. Add 2¾, $\frac{4}{7}$, $6\frac{1}{12}$, 13⅛; and reduce 3*s.* 7½*d.* to the fraction of 5*l.*

3. Multiply 15⅝ by $109\frac{4}{7}$; and divide 61*l.* 4*s.* $7\frac{5}{13}$*d.* by $267\frac{2}{15}$.

4. In money transactions, what is necessary besides a cash account, and why? What is meant by posting?

5. What are bills receivable? When received in payment of goods, how should they be entered?

SUPPLEMENTARY.

1. If 15*l.* 12*s.* pay 16 labourers for 18 days, how many labourers, at the same rate, will 3*l.* 2*s.* 5*d.* pay for 24 days?
2. Reduce 2*s.* 7½*d.* to the decimal of 3*l.*; and 2 hours 16 minutes to the decimal of a day.
3. Find the interest on 436*l.* 10*s.* for 3 years 8 months at 2*l.* 13*s.* 4½*d.* per cent. Work this by decimals.
4. Between 1801 and 1811 the population of Edinburgh increased by 24¾ per cent., and in the latter year it was 102,987. What was it in 1801?

ART OF TEACHING, SCHOOL MANAGEMENT, ETC.

Section I.—1. How do you propose to teach the elementary sounds and signs of the English language? State your reasons.

2. What exercises are most useful in teaching children to speak correctly and fluently?

3. By what exercises are children taught to distinguish colour, form, and place? What is the practical use of such exercises?

Section II.—1. Describe accurately the proper position of a child's hands and body in a writing lesson. What habits should be guarded against in teaching to write on slates?

2. What exercises are best for spelling and simple composition?

3. In a mixed school of 70 children, between 6 and 12 years old, what lessons ought to be done at desks? What arrangement of such desks would you prefer, and why?

Section III.—1. What assistance would you require to conduct a school of 80 girls? In what respect does the system of Pupil Teachers, under the Minutes of 1846, affect the employment of Monitors?

2. What are the peculiar advantages of a gallery? For what lessons would you employ it in an infant, a mixed, or a girls' school? Give the best dimensions and shape, with a drawing.

3. On what subjects, and to what extent, would you require exercises to be written by children out of school hours? What are the difficulties, and how can they be surmounted?

SUPPLEMENTARY.

Write an essay on one of these subjects:—

1. The relative duties of schoolmistresses and pupil teachers.
2. The relation of schoolmistresses to the parents of children.
3. What dispositions, habits, and attainments ought to have been acquired by the daughter of a labouring man on her quitting school to go into service?

DOMESTIC ECONOMY.

Section I.—1. Is it more advantageous for a schoolmistress to purchase furniture, or to occupy furnished apartments? What furniture would she require? Calculate the expense.

2. What effect has the employment of women in charring, washing, or out-door labour upon their families?

3. What are the main points which a mechanic or labourer should look to in taking a house? What proportion should the rent bear to his earnings?

Section II.—1. Give rules for the management of poultry; calculate the expense of keeping them, and the probable gain in the neighbourhood of London, or of any particular provincial town.

2. Enumerate the leguminous plants, and succulent roots. State the best mode of preparing one of each kind.

3. Name the articles of food which are of most use in a sick room. Show the use of these in special complaints, or in convalescence.

4. What habits of self-denial would you recommend a young woman to practise in order to provide for old age? Calculate the saving that can be effected thereby.

Section III.—1. Compare the price and durability of stockings knitted at home, or bought at a shop.

2. Specify the items, and calculate the cost, of a young woman's outfit for a voyage to Australia.

3. What effect has the employment of girls in straw-platting, and lace-making, upon their moral habits, and the comfort of their homes?

Section IV.—1. Describe the precautions to be observed in cases of contagious or infectious complaints.

2. Describe the symptoms of measles, scarlet fever, and croup.

3. Enumerate the mineral or vegetable poisons which are likely to come in the way of children. What are the readiest and most effective antidotes?

Section V.—4. Prepare the notes of a lesson on
The qualifications and duties of a sick nurse,
Parlour-maid, or
Plain cook.

To Correspondents.

G.—Notices of several books are postponed till next month. We cannot, however, undertake to notice everything that we receive.

P. H. H.—Arctic Discovery (Edinburgh: Cabinet Library, 5*s*.), and Banaos' Voyages of Discovery in the Arctic Regions (2 vols., 27*s*.) contain what you require.

ON THE STUDY OF LATIN AND GREEK.

If we were asked why we study Latin and Greek, most of us would find it difficult to give an answer. One reason is, and the chief reason, that our fathers, and fathers' fathers did so, and we do the same. There is something in this, but it is not all. The true reason why we ought to study the language, literature, and history of Greece and Rome, is that these things belong to us as much as to the Greeks and Romans. The civilization of Europe is not derived from the Chinese, or the Hindoos, or the Hottentots, nor from the ancient Germans, or Galli, or Britons. It came from Athens and from Rome. The Greeks are the parents of art, of science, of philosophy, and of composition, epic, lyric, dramatic, historical, and oratorical. The Romans learned much from the Greeks, and added something of their own. They taught law to the nations of Europe, and civil administration. They were the founders of municipal constitutions in the towns of western Europe. They maintained armies and fleets to conquer countries, and keep them in obedience. They practised the military art on a large scale; they governed countries as provinces, which are now great kingdoms; they taught the people obedience to law, and gave them rules for civil life. They were conquerors, masters, stern rulers, sometimes hard and cruel; but they were lovers of order, and they showed men how to live. Their agriculture was carried into Spain, France, and Britain. They built walls round the chief towns, bridged the rivers, cut roads, and placed milestones on them, and built convenient stations between towns, for the ease of travellers, and to maintain their own communications. They gave to every town of note, temples, baths, theatres, sewers, and an abundant supply of water. While they taught the Gaul and the Spaniard to live like a Roman, they also taught him their own vigorous and majestic language. All their works bear the stamp of grandeur and good sense. They worked for future time, and they laid the foundations of the social system in which we now live. Of all the nations that have established a great empire, they have been the most energetic, the most practical, and therefore the wisest. The only people of modern times, who can be compared with them are the English, who in practical wisdom are certainly not superior to the Romans, and in the greatness of their conceptions far below them. Both have planted, and the English are still planting their language and manners wide over the globe. The language of the Romans in Italy, Gaul, and the Spanish peninsula has taken a new form, but it still shows its original. The English is in all the four quarters of the globe, or rather in the five; and its future condition is uncertain. Printing, and the facility of intercourse, will keep it uniform enough, perhaps, to be always intelligible, but it will be greatly corrupted. That which will do most towards maintaining it in a tolerable condition, is the possession of a common literature by all who use the English language: not our modern literature, but our old writers. A few good books appear from time to time in England and the United States, which may become standard works; but nearly all that is written now-a-days in newspapers and periodical publications,—nearly all the light literature, or by whatever other name that is called which everybody reads,—will perish after it has amused for a time and done its mischief. Whatever shall live fifty years, must be good; and our children will know better than we do what has strength enough to hold out beyond the usual term of a book's existence. Certainly most books will not reach threescore years and ten, the ordinary limit of human life.

It is the old books then which we possess and read, and the few books, now young, which will live to be old, that will do most towards keeping our language in a state of purity. Language is never fixed—it is always changing. Change may be improvement or corruption; and, in the present state of our history, it is hardly possible that our language will be improved. It is certainly changing very fast; and at present all the change is for the worse. One cannot take up a pamphlet of any kind without finding something new, and something bad.

The languages of modern Europe, which are of Roman original, cannot derive much from the parent language for their improvement now. New ideas and new circumstances, the growth of modern times, work on language with irresistible force, and it must change under their influence. The nation that in modern times has done and suffered most, the French, has felt the effect of it in the language. The languages of Italy, Spain, and Portugal have changed little in comparison with the French, which seems to us to have had its share of the national misfortunes; for, though there are many excellent French writers of the present century—some who are models of style—a monstrous amount of bad language has been put in circulation, some of which is now current coin.

The nations of Europe, and the descendants of Europeans all over the world, have common notions and opinions. They are in many ways one. They are less strangers to one another than the nations of antiquity, which is owing mainly to two causes, the having a common religion and a common literature. The common literature is the Greek and Roman, which is the study of all educated men in all countries during their youth. When the time of youth is over, this study is generally at an end; but it is not without its effect on the taste and judgment. The best modern writers, those whose works are made to last, still come back to their old books, and still find in them the best models; not models for servile imitation, but something on which the mind can repose with pleasure, and feel its vigour strengthened and its taste improved. The class called the learned have, with few exceptions, derived little profit from the study of the ancient writers. Those commentators who have laboured hard and well to purify corrupted texts, and to expound the difficulties of the Greek and Roman authors, are worthy of all praise for a labour which few can appreciate. But the great mass of commentators are mere parasitical animals, who feed on a noble body, and turn the nourishment into a gross material. It is surprising how few of the whole class seem to have been made one bit the wiser or better by all their labour, which is to be explained partly by the nature of the labour itself, where it has consisted merely in settling texts, and often corrupting them under the pretence of amending, but mainly by the character of the men. For it is not enough to have a tolerable knowledge of the Greek and Roman languages to make a man fit to explain a Greek or Roman writer: a sound knowledge of the language is necessary; but it is not mere grammatical knowledge, as it is called, which gives a man a mastery over a foreign tongue, and fits him to expound a foreign writer.

We cannot attain a clear notion of the value of Greek and Roman literature to us, unless we see also how it has a value for other nations. Every modern nation which has a literature, has something of its own, which makes it what it is; but every nation also has derived a great deal from ancient literature, and each has used it in its own way. England and Germany, for example, have a literature of their own; each has its character, and the character is very different. Both nations have used the ancient models, but in different ways. They have both used and abused them; but the originals still remain, and they are just as good as ever they were, ready to serve him who knows how to handle them. The French have often abominably misused their ancient models; but a thing is not bad because a man cannot see what it is fit for, and what it is not fit for. The Italians, the poets at least, have generally used their Latin models better than the French: they have got little from the Greeks, for they knew little of them. An instance will explain this. Lessing has shown to all who have any understanding, that it is a poetical blunder to describe the beauty of an object. Neither poetry nor human patience can tolerate a description of the beauty of every part of a woman's body. Ariosto has done this in many stanzas (Orlando Furioso, Canto vii. 11, &c.), and we are weary of his work, though in its kind it is not bad. But we blame him for doing what he ought not to have done. Homer knew better. He felt that the beauty of the human form is only understood by being seen. So the old men of Troy, who see Helen approach say, (Iliad iii. 156)—

Οὐ νέμεσις Τρῶας καὶ εὐκνήμιδας Ἀ'χαιοὺς
Τοιῇδ' ἀμφὶ γυναικί πολὺν χρόνον ἄλγεα πάσχειν·
αἰνῶς ἀθανατῃσι θεῇς εἰς ὦπα ἔοικεν.

It is plain to every man who will give the matter a slight consideration, that the literature of modern Europe has derived much, both directly and indirectly, from the Greek and Roman; and that if a man would study the literature of any modern nation, he will not understand it well without a knowledge of ancient literature: for in France and Italy the modern literature is founded on the ancient; in England and Germany it has derived much from it.

Modern society is a much larger and more complicated system than ancient society. It has created new things, and has done wonders; it has new ideas, and new wants; and, though man is still the same, a man of modern times is very different from a Greek or Roman. A stupid, bigoted admiration of antiquity is just as senseless as the contempt which is expressed for it by those who know nothing of it. A mere imitation of what is old, a copy of it, or what is more common, a caricature, disgusts all men of sense. Everything has its time and place. What was good and true at one time and place will not always do for another. If a man could write a play like Sophocles, it would be a wonderful thing; but, except to a few, it would be as unintelligible as Sophocles. If he tried to write a play like Sophocles and failed, he would have wasted his time in generating a monster. If a sculptor will make a Jupiter or a Juno, or any of the deities of Olympus, he will either fail most disgracefully, or he will make something that only a few can understand. He may be content with the praise of the few, and may deserve it; but the artist ought to work for all. If he should take it into his head to show us Horace's dream in marble, as one unlucky adventurer has done, he proves that he has not the slightest conception of his art. Here he must fail; and here is the thing that ancient art, if he knew what it was, would have warned him against. Further, if he will write in Greek and Latin, and call one specimen Sappho, and another Horace, and a third Herodotus or Thucydides, or so on, we are precisely in the plight of the sculptor who makes Jupiters and Junos, or Venuses. One sculptor may do it,—one out of the whole number, who by some mistake is living at the wrong time and in the wrong place. One man may write some Latin or Greek poetry, which really has the true character of antiquity. A few admire and wonder; the many either do not understand, or admire and wonder because they are told that they must, under the pain of being set down as fools and men of no taste. But all imitation is bad. A great workman, whether he works with words or in stone, or paint on a surface, must produce something that belongs to his own time. What then is the real use of this study of antiquity, whether of marbles, or of books, of forms in stone or metal, or of thoughts in words? The use is plain to those who will take the pains to think. It is not the thing that a man produces which we admire; it is the form and the life that he gives to it. One thing is above another. The representation of the human form in all its beauty is above the representation of a beast. Praxiteles made a Venus, and Myron a calf; and all antiquity gazed with admiration on both.

It seems to be hardly understood,—many at least do not know it,—that the truth and beauty which we admire in the Greek artist, are the very things that we should learn to admire in their best writers—truth and beauty in thought and in words. Truth is simple, whatever it speak about; and beauty refuses all ornament. The best works of the Greeks were few. All that remain, with the exception of one whose mysterious birth is unknown, were produced within a very small number of years. In the declining age of Greece, works innumerable were produced; grammarians, rhetoricians, and the like, swarmed. The mass of worthless stuff that still exists is amazing. Would that the learned would let it rest and rot. We have enough of the good to improve our taste, to rouse our minds to the highest speculations, to civilize the world again, if it should again sink into barbarism.

For the poet, for the philosopher, for the historian, for the sculptor, and the man of pure taste, the Greek has left a legacy, small in amount, but above all price. The Roman is the practical man. He is the civilizer of Western Europe. We have built on the ruins of his work. All that he has done, both bad and good, is a lesson for us. He has left us an inheritance of great deeds, of lofty thoughts, and a language unequalled for clearness, dignity, and force. In what way we have used and have abused this language, I shall show in another paper; and how we may hope to save our language from being spoiled by those who must and will write, and cannot be stopped. G. L.

MILITARY EXAMINATIONS.

It having long been the general opinion that the officers of the unscientific branches of the British army were in most cases very illiterate, that those young gentlemen who were destined for the military service commonly neglected their learning, and that those who had neglected their learning were not unusually chosen for that service, the authorities at the Horse Guards a few years ago resolved that this scandal should no longer exist; orders were issued for the examination of candidates; a scale of knowledge was appointed by regulation; the course of an expectant officer's reading was cut out for him as rigidly as his future coat and pantaloons; authors and editions of authors were named as precisely as the number of his buttons; and now every lad who has the good fortune to be informed that the Commander-in-Chief will in due time nominate him to Her Majesty for a commission, has his new-found happiness damped by a paper defining the attainments expected of him, in terms as peremptory as the Articles of War or the orders on the eve of a general action.

Whether the officers of the army were or were not more ignorant on those points on which gentlemen are supposed to be informed, than some other classes which help to represent the educated portion of society, we have no means of knowing beyond common report, to which, so far as it was unfavourable to the officers, the principal authorities have given their assent, by establishing the examination above mentioned. Whether, if the standard of education was low before, it is much higher now, or whether the measures adopted for the purpose of raising it are calculated to have that effect, may very fairly be doubted.

It appears in the first place, that the military authorities have unconsciously established a new principle, and have virtually determined that the education of a scholar and a gentleman shall not be the education of an officer. The nurseries of the learned professions and of the upper classes of society have hitherto been mainly looked to for supplying the army with officers, except in those branches in which it is supposed that a scientific education is more particularly required. To break this connection between the public schools and the army would be attended with consequences which are not anticipated by many who nevertheless advocate the examination for commissions. But unless those schools are prepared to alter the principles of education upon which their reputation is built, they cannot undertake to prepare young men for examination by military professors upon principles different from their own. Whether a grammatical education is or is not the best sort of training for young men may be matter of opinion, but there can be no doubt that the foundation schools of the country are for the most part grammar schools, and cannot abandon that ground without violating their statutes. There can be no doubt either that these schools, with all their defects, have hitherto mainly supplied the upper classes with their education, and have helped mainly to form the tastes and manners of English gentlemen. We believe it is not intended to separate the military class from all those with whom they have hitherto been associated. It is not in contemplation that Winchester, Eton, Harrow, and all our old grammar schools should cease to send officers into the army. But as matters stand at present, the tendency of this examination is to prevent boys whose destination is the military profession, from being sent to such schools, or to withdraw them at the age when they are deriving the greatest benefit from them; and for what purpose? That they may be sent to inferior schools, or to private tutors, to be filled with knowledge of which, in the shape in which they have to acquire it, they can make no use, and to be prepared for an ordeal which is no test of merit, though it may be a trial (and a sore one) of memory.

The list of subjects for examination comprises, among other branches, History, in which the candidate is required to have read Hume and Smollett's History of England, a History of Rome, another of Greece, and another of modern Europe, and on all these histories he is "to answer such questions as the examiners may propose:" that is to say, he is to know the history of all civilized nations, from the fall of Troy to the present day, and to know it so as to satisfy examiners, of whose mode of examination he and his teacher know nothing, unless the latter happens to be a gentleman in the examiner's confidence, or one who, having made it his trade to prepare youths for this examination, has learnt to calculate the chances of it, and to prepare his pupils accordingly. This is not the occupation that tutors of standing usually engage in, and it creates a class of teachers of low intellectual calibre, to whose training and society young men destined for the army are thus necessarily committed, usually for not less than a year, and sometimes for much more, according to their capacity and habits of industry. For many boys private tuition (even the best) is not desirable; some require a stronger stimulus, others, a stronger discipline than that system affords. But to private tutors, or to establishments of a semi-professional kind, young men must now be sent, and hundreds are sent, to prepare for the army. The multiplication of such places of instruction may safely be declared to be a detriment to the country and to the cause of education.

The head masters of grammar schools are not rarely pained by pupils of promise being removed from their care at the most interesting age, when their labours have begun to bring forth fruit. The writer has seen instances when the parents were as sorry as the master that their sons should be taken from school, having no confidence in the change which the new regulations forced upon them, and being reluctant to forego the advantages of a good school for the dangerous experiment of private tuition and empirical instruction. To take a single and recent case, which was that of a clever and well-bred youth, son of a member of the House of Commons, a boy of taste and spirit, and a good scholar. With infinite pains he was being brought into habits of application, which were what he chiefly wanted, and to which he was certainly advancing. He had a desire to enter the army, and his friends thought it right to gratify him. At the age of seventeen he was promised a commission, with the probability of getting it within a twelvemonth. His friends grew nervous about the examination. They removed him from school, and sent him to a private tutor, a very respectable gentleman; he was sent up to Sandhurst within the year, and was rejected. It is possible the boy was not as industrious as he might have been. He may have passed a bad examination—that is to say, he was probably unable to discuss the Licinian rogations, was not much versed in the history of the Alcmæonidæ, did not even know the date of the siege of Platæa, and had not gone through Russell's History of Modern Europe. Whether he understood logarithms, how much he knew of practical geometry, or of field fortification, we cannot tell. But when he left school he had all the elements of a scholar and a gentleman, and he was then beginning to acquire habits of self-discipline, which are best acquired at a good school, and which are of much more importance to an officer than a miscellaneous acquaintance with historical dates and facts which the mind at an early age can hardly assimilate.

A knowledge of history is made a large element in the requirements for this military examination. But it may be confidently said, that this knowledge can only be gained in such a way as to benefit the mind, after it has been trained and disciplined and brought near to maturity. With rare exceptions, a true knowledge of ancient history can only be grafted on a knowledge of the ancient languages, and acquaintance with the authors who wrote in them. And if persons in later life attempt (as they sometimes do with success) to master the histories of Greece and Rome, having neglected to make themselves masters of the Greek and Latin languages, they lament their ignorance at every step. To expect of a boy, therefore, whose Latin may extend only to the construing in a slovenly way of Cæsar's Commentaries, and whose Greek does not perhaps extend to the alphabet (for Greek is not required), an acquaintance with ancient history is absurd. He may take a chronological table, or Mr. Chepmell's syllabus of all histories, and by dint of cramming, and with the help of a good memory, may come to know by rote a certain number of leading dates, and names, and facts, especially battles; but if he keep this mass of stuff clearly arranged in his head till the day of examination comes, and if his nerves on that terrible day are pretty strong, and the examiner not very tiresome, so that he is not driven to confound the battle of Mycale with the battle of Cannæ, the pass of Thermopylæ with the Caudine Forks, Pericles with Themistocles, Pyrrhus with Hannibal, and so forth,—his knowledge of history has accomplished its mission; he passes his examination (unless he breaks down in something else) and breathes freely after a tedious and profitless and anxious period, which should have been devoted to preparing his mind for the reception and digesting of knowledge, which without such preparation he is only too glad to throw off and to laugh at as so much useless lumber.

This sort of information, got up from Mangnall's Questions, is considered of importance to young ladies at boarding-schools, and they add to it a little acquaintance with ancient mythology, so far as that is compatible with the delicacy of such establishments; but how in this crude shape it is to benefit a British officer it is not easy to conceive. It is unmanly and degrading. It does nothing to expand the mind, but tends to contract it, just in proportion as it is taught to set value on an acquirement so worthless.

It may be said that after all the examination is very slight, and not worth all that has been said about it. But if the examination be slight—(as in some instances it must be, to judge by those who pass)—if in ancient history it will be nearly enough to know that Athens was built before Constantinople, that Miltiades did not burn Carthage, nor Scipio win the battle of Marathon; if the history of modern Europe is to be told in the names of half a dozen familiar battles, and the history of England to be comprised in the exploits of Marlborough and the date of Magna Charta; if the examination is to be of this superficial order (and in some cases it approaches to this, but not in all, and caprice makes the matter worse), then it is a mere sham, which ought to be abolished, a bugbear to alarm nervous boys and to disturb their education, but confessedly useless and contemptible. But the examination cannot be treated lightly, however frivolous it may sometimes be, so long as it is attended with the results described above, namely, withdrawing young men at a critical age from the best places of education, attaching the stigma of rejection and incompetency to those who are well fitted for the profession, holding up a paltry standard of instruction, and giving currency to an inferior order of books,—to which subject we have not yet alluded.

A list of books is appended to the paper of regulations, as those "which are likely to facilitate the studies of the candidates." It is a mere advertisement, forcing into notice, and almost into sale, a number of books, of which some are notoriously bad, and others no better than many of the same kind. For instance, the candidates are advised to get the Valpy or Delphin editions of Cæsar, Virgil, and Livy,—editions which every scholar puts from him, and every good schoolmaster keeps out of the hands of his pupils. The candidates are also told that the Eton Latin Grammar will facilitate their studies, and Dr. Butler's Sketch of Ancient and Modern Geography, an 8vo. volume of 336 pages without the index, and of corresponding cost. The recommendation of books of this kind shows either a woful ignorance on the part of the authorities putting forth the list, or an intention to serve the interests of particular publishers, at the cost of the candidate, which is discreditable.

One tendency of this system is to produce text-books suited to the examination, and bearing a sort of stamp of authority, which books are in fact the basis of the examination, and are studied as such to the neglect of better books which do not tell. Such is the case in this instance, Mr. Chepmell's "Abridgment of the Histories of Greece, Rome, and England," being in fact the only book of history that is read. A more crude compilation never issued from the press.

A good many facts might be given to show the capricious character of this examination, and the estimation in which it is held by those who have undergone it. But these shall be reserved for another occasion.

All that the sincere and disinterested supporters of a preliminary examination desire, may be secured by surer and simpler means. They wish very properly to relieve the army of the stigma which some persons have attached to it, of ignorance and intellectual indolence. If, then, it is considered necessary to admit mere boys to commissions, as they are now admitted, letcare be taken that each brings with him a character for steadiness, and a fair amount of diligence and attainment, from the school in which he has been educated, or from his tutor, if he has not been at school. It will be easy to prevent this from falling into a mere form, much easier than to prevent the formalizing or other abuse of the examination. Let it be seen that the authorities require a *bonâ fide* certificate, and such will be given by every respectable schoolmaster or tutor, and if any were known to give a false certificate he should be marked and exposed. A boy's place in his school, when compared with his age, will usually be a safe general test of his abilities or his diligence, or both: at any rate, a certificate which should not be borne out by this evidence might naturally be so far doubted as to lead to further inquiry. Some person might be appointed to pass and countersign these certificates, for the information and security of the commander-in-chief, and his business would be to ascertain, among other things, the character of the school the candidate came from, and the value of the testimonial as connected therewith. Those candidates who, from their own neglect or intellectual deficiency, had done no credit to their education, might very well be rejected; the idle, because the army will not be encumbered with idlers; and the unintelligent because the army does not wish to be the refuge of the dull, but asserts an average standard of intelligence as high as other professions. By pursuing this course, the military authorities would not only secure the army against ignorance and idleness, but also would do good to the cause of education generally, and would assist in keeping dulness in its proper sphere, which is the mechanical departments of life. It is quite right that the army should claim to be supplied with well educated men. All that is intended by these remarks is to prevent that being taken for education which is not only not education, but entirely opposed to it. Leave the boys alone; leave them to that process of development which is natural and healthy, and for which the means are to be found in the places of sound education with which the country abounds; let them be trained as other gentlemen are trained; take such candidates as, being of fit age, give promise of doing well, and then, when you have got them in the army, do with them, require of them, what you please; let promotion depend upon professional merit; let your ensigns be admitted on probation, or whatever experience may suggest, but do not cramp the young intellect by putting it through a course of professional and empirical teaching at a time when it ought to be expanding under the influences of a liberal education. If the authorities at the Horse Guards would accept and act upon such suggestions as these, they would do their duty, and would meet the cry of education for the army in such a way as to improve the service and to silence that cry more effectually than they ever will do by the present ridiculous examination.

A. M.

GOVERNMENT EDUCATIONAL SCHEME.

The propositions of the present Government respecting education have been so much talked of and so anxiously expected, that it would almost amount to indifference not to take some notice of them, now that they have been announced. In calling attention to the state of education in England and Wales, in order to make the promised statement, four very important subjects have been touched upon. These are, the support of day schools for the poor; the supervision and regulation of charitable endowments; the management and improvement of the School of Design; and the reform of the universities. Of these subjects some have indeed been only touched upon, and the course hereafter to be pursued with respect to them but partially intimated. The universities are for the present to be let alone, that it may be seen to what extent they are willing to reform themselves. It is proposed that the sums hitherto granted for the department of schools of design, and for the purpose of science, should be united, and a department created to be called "The Department of Art and Science, under the Board of Trade," with two secretaries—one for scientific purposes and one for art. In connection with this department are also to be museums—one for scientific subjects and one of art. And in the department of art, instead of presenting, as heretofore, certain schools with particular forms and models, the best drawings and some of the models will be furnished at half cost to any of the public schools that apply for them, for the purpose of improving their pupils in drawing. As regards the supervision and regulation of charitable endowments, suits respecting charities of less than £30 a year income are to be carried to the county courts, and larger charities to the Master of the Rolls or the Vice-Chancellors, who are to have special powers for the purpose. And as to the support of schools for the poor, it is proposed to give corporate towns the power of raising rates for the purpose of improving education, subject to certain conditions.

To effect this last object, a measure has been prepared and printed, entitled " A Bill for the Promotion of Education in Cities and Boroughs in England." In this bill it is proposed that the municipal council of a town may, by a majority of two-thirds, levy a rate for the assistance of existing schools, on the condition that the schools thus assisted be under the Committee of Council, and so partaking of the pecuniary and other advantages of that connexion; and that, in the case of any school aided by the school-rate, any child may be withdrawn by its parent or guardian from the religious instruction in such school. By those who are in favour of the principle of an educational rate, the recognition of this principle is considered the most important part of the proposed measure. Even those who doubt the value of the plan will hardly object to its being brought to the test of experiment, since, if upon trial it be found to fail, its present supporters will cease to urge its adoption. For our own part, we are not among those who entertain very sanguine expectations of the success of such a measure. Our sentiments upon this subject continue what they were when, more than a year ago, we were led to notice the Manchester and Salford Education Bill.*

We then expressed our belief that the great obstacle to the success of all such measures is the parents' taking the children from school as soon as they are able to earn anything, and that the mere saving of threepence or fourpence a week for schooling, by providing it either free of expense or at a low cost, will be regarded but as a small benefit, when set against two or three shillings which may be earned in the mill or workshop. The only method which we could suggest of overcoming this obstacle was, to devise some such plan for those past the earliest years of childhood as would combine a certain amount of school teaching with profitable employment and actual training in works of industry; and we ventured to indulge a hope that skill, similar to that which has been so successfully applied to purposes of art, would in like manner be exercised for the higher purposes of promoting the temporal and spiritual welfare of the rising generation, by so regulating their hours of labour as to afford them opportunities of employing the mind as well as the body, and of increasing in wisdom as they grow in stature.

When we gave expression to that hope we little expected to see so speedy a fulfilment of it, as may be found in a recent number of our Journal, in the account of the factory schools of Price's Patent Candle Company, and of the Agricultural Schools in Ireland. It is to the practical means suggested by such experiments as these, not to any educational rate, nor to any state interference, however wise and powerful, that we must mainly look for success in promoting the education of the poor, and in making them sensible of the value of instruction, by rendering it such as admits of direct application in what may be called their work-day world, and of combination with their daily employment. The Patent Candle Company have taken the simplest and most effectual means of attaining these objects, by establishing schools in their factories, or in immediate connexion with them. When we first met with the account of the actual working of the system adopted by them, it seemed to us more like an imaginary illustration of a favourite theory than an authentic statement of what had positively taken place, and is still going on, in real life. But our readers have already had many of the particulars of this account laid before them in our pages. We will therefore now only refer to them, so far as they may assist in throwing light upon what we believe to be the method most likely to prove successful in promoting the education of the poor.

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* Journal of Education, Vol. v. p. 445.

In our notice of the Manchester Education Bill, already alluded to, we observed how great an advantage it would be for young persons in manufactories, if, during those periods of fluctuation when many can only be partially employed, an opportunity could be afforded them of turning to good account the intervals of time which would otherwise be misemployed, by devoting those intervals to keeping up and adding to the learning already acquired. In the Special Report of the Directors of the Patent Candle Company, we find that provision has been made to afford such an opportunity to the young persons who work in their factories. It is there stated, that it has been ascertained that in the manufacture of night lights it is better they should be made not long before they are sent out; and that, consequently, as the demand for them varies greatly, it is often necessary to take on a number of additional boys in a busy time, and then to let them go again when the demand slackens. These boys were, in many cases, taken away from schools to come into the factory, but frequently did not go back to school again after once being at work, but, until they could be employed again, idled about and learned bad habits in the streets. To remedy this evil a day-school was opened in the factory, to which to send young boys when not wanted in the work. And thus, in the case of the younger boys, it is stated that the difficulty arising from this evil has been completely got over. They pass from factory to school, and from school to factory again, at a moment's notice, according to the variations of the work, and are equally well employed, and equally forming good habits in each, and are kept in the same discipline in the one as in the other. Nor is this all. The day-school is not exclusively for boys who have been at work in the factory, but there are a great many taken into it before the age at which they are old enough for the factory; and when they are old enough, those who have gained the best characters in the school, are taken first when new boys are wanted for the work. And it is mentioned that before there was this sort of nursery ground to the factory, it was often necessary, as the calls of the work for new boys were made at an hour's notice, to take on the first that came to hand. Some of these would be very careless; and as the night-light work is very delicate, even a single thoroughly careless boy could do a good deal of mischief before the fact of his carelessness was sufficiently proved to cause his dismissal. But the day-school has put an end to the necessity of taking in boys who are not known. Except in very particular cases, even boys old enough to work, are, on first coming to the factory, sent into the day-school, if only for a week or two, that, if they should happen to be incorrigibly careless, the discovery may be made there instead of at the factory. It is also stated, that partly for the sake of getting money to carry home, and partly on account of the supposed great advance in life, the poor boys are very eager to leave the school for the factory, although they only come to the school at nine in the morning, to work for five hours, whereas they must come to the factory at six in the morning to work just twice as long. And this eagerness is a rule without exception, even in severe winter weather. The fact of the master of the school having at his disposal so great a prize for good conduct, as the sending a boy to work, gives him much greater power over his scholars than that possessed in an ordinary school. And it has been remarked, that with such power in their hands the directors of this company might, if they pleased, get up the finest school in England, and if they chose to start one for a thousand boys, could always keep it full. Hitherto their day school has been established and maintained at their own expense. But it appears to be their intention to establish an entirely self-supporting school outside the factory, from which to promote the oldest and best of the boys, into the factory free school, and from thence, as opportunity offers, into the work: so that the boys taken into the factory would be the best of a much larger collection.

This short account is of so much importance that we have ventured almost to repeat it, although it has so recently appeared in our Journal. By showing how some school-teaching may actually be combined with profitable employment and actual training in works of industry, and by rendering the school-room a nursery for the factory, and a sort of safety-valve by means of which the surplus hands may be preserved from misemployment, and at the same time improved, it seems to suggest a course obviously and immediately beneficial to all concerned—to parents, to children, and to the employers themselves. It is not the least striking part of this particular case, that it is a statement made by the masters of what they have done of their own accord, and of the benefits which they have themselves experienced from adopting such a course. The excellent man under whose superintendence and direction this great experiment has been made, acknowledges that it is impossible to state the amount of direct pecuniary advantage to the company from all that has been done and is doing. But although it may be impossible to trace out the details, or to say such and such a hundred pounds spent at such a time on the boys brought back two hundred pounds before such a date afterwards, yet he says, "If I were forced to come to some particular proved instances of benefit to the business, I should take first the one of a number of boys working so steadily and well, at what a few years back we should not have thought of trusting to any but men, it being work requiring much greater care and attention than can be reckoned upon from ordinary untrained factory boys—yet even here the exact pecuniary benefit cannot be stated; for the boys thus employed are not substitutes for men, but for machinery. It is the fact of our having at command cheap boy labour which we dare trust that enables us to make now by hand the better sort of candles, which we used to make, like the other sorts, in the machines, and which, on account of the hardness of the mateterial, when so made, were never free from imperfection. The benefit will come to us, not in saving of wages (for had the choice been only between the men's dear labour and the machines, we should have stuck to the machines), but in increased trade through the imperfections of the candles alluded to being removed." Another advantage of the school system is, its happy effect in producing steady and cheerful industry, and in improving the *morale* of the workers, which has been found to have intimate connexion with the efficiency of the work done, even when everything that can be done by piecework is done in that manner. A further advantage is, that there is thus provided in the factory system itself counteracting influences to those evil ones which are sure to spring up and to spread rapidly in any collection of young people of this class, if left to take care of themselves. These results are as productive of benefit to the employers as to the employed; but they proceed from the good arrangement and liberality of the masters, and are proofs of their concern for the welfare of their youthful workpeople. Such conduct insures the good will and co-operation of the parents, who are only too thankful to send their children to school when it involves no sacrifice of their earnings, but opens a prospect of employment to them and qualifies them for it. The children are not transferred at once and for life from the school to the manufactory, and from the exercise of the mind to the labour of the body, but the powers both of the mind and the body are in turn employed, and so grow and strengthen together, and are made mutually subservient to one another. And thus, as it has been proved, they become better workmen by uniting the improvement of their moral and rational powers with the acquisition of manual dexterity and habits of labour.

Where the benefits are so manifest, and extend to all concerned, it can be scarcely needful to do more than to point them out, and the method by which they may be secured. In the instance before us the employers have taken the expense of the schools wholly upon themselves. But this is not to be expected generally; nor, indeed, will it be required. Much as has been said of the large grants made of late years by parliament for the education of the poor, it appears that these grants form but a small proportion of what has been actually expended for that purpose. In fact, they do not amount to one tenth of the whole expenditure, and are less than one-fourth of the children's pence. These pence are not only more than quadruple of what has been granted by the state, but they are also greater in amount than the contributions of the rich. If the amount of these pence were three times what it is, we are convinced that they would not even then be regarded by the poor as so formidable an obstacle in the way of sending their children to school, as the loss of their earnings, and of what they consider no less valuable, the early training of their children to industrial employment, whether in the field or the factory. Satisfy the parents on these two last points, and they will readily pay twopence, or fourpence, or sixpence for the weekly schooling. We are convinced that they would willingly bear the whole expense of the factory school, and readily consent to a proportionate deduction from the earnings of their children. In such a case no educational rate would be needed. We believe it would prove injurious rather than otherwise by discouraging the voluntary exertions both of the parents and the masters. Pecuniary assistance from the state will not be needed for the permanent support of such schools, though we believe it might greatly facilitate their first establishment, when there is the heaviest call upon the funds, and the resources are the lowest, and when there is most need of counsel and encouragement. Government may also afford valuable assistance to such undertakings, both by providing teachers properly qualified, and by sending their inspectors, who will thus enable the masters to afford a guarantee to the parents of the children, and to the public generally, that the schools connected with factories are properly conducted. It is, we are convinced, by assistance of this description, not by the enforcement of an educational rate, nor by any interference in religious teaching, that the government of this country will most successfully promote the education of the poor. We cannot therefore help wishing that the scheme recently proposed had borne marks of being derived from some actual experiment, such as the admirable and happy one of the Patent Candle Company, rather than from the plausible theories of political supporters; and we trust that if the educational rate should prove a failure, a fair trial will be given to a plan which manifestly combines the immediate interests of all concerned in carrying it out, against which no weighty objections can be raised, and which has the peculiar recommendation of having been already tested with almost incredible success.

PAPERS ON PHYSICAL GEOGRAPHY. No. 1.

EARTHQUAKES AND VOLCANOES.

The subject here selected for illustration constitutes one of a numerous class of topics included within the study of Physical Geography, a science that has of late so justly commanded attention in our schools. It refers to the disturbing agencies in the condition of our planet's surface, rather than to those more permanent features in the natural aspect of the globe which it is the business of the physical geographer to trace; but it will be found, on examination, to be connected with inquiries of the highest importance. It possesses, moreover, in no ordinary degree, that quality of human interest which is never, indeed, altogether wanting to scientific investigation, but which is more strikingly developed in some cases than in others. Such phenomena as we have here to consider compel the active attention of all who are exposed, even in a modified degree, to their influence; and the disastrous results which they too often produce awaken the sympathies of distant nations.

The earthquake and the volcanic eruption, though manifesting their forces in different ways, are due to analogous causes. Both phenomena exhibit the action of the heated interior of the earth upon its external surface. That a high degree of heat exists in the interior of our globe is proved by direct observations, made at widely distant places. Records of the temperature of the air at the bottom of deep mines, as compared with that of the atmosphere at the surface, together with similar observations on the degree of heat exhibited by the waters of springs issuing from considerable depths, all point to a direct and nearly uniform increase in the terrestrial heat, in proportion as we descend from the earth's surface towards its centre; and the average result of such observations shows a rise of temperature in the ratio of one degree of Fahrenheit for every fifty-four feet of perpendicular depth.*

It must be understood that such observations as are here referred to have been made in the most widely distant regions, upon continents and in islands, in level plains and upon the elevated sides of mountain terraces and plateaux, at various heights above the surface of the sea, as well as at various depths below its waters—alike in cold as in warm countries—and that this increasing subterranean heat is uniformly found to prevail. The heated condition of the earth's interior is, in fact, nowhere more conclusively evidenced than in sinking to considerable depths within the cold regions of the Siberian plain, where, as in those portions of the North American continent which are similarly proximate to the Arctic circle, and similarly exposed to the influence of intense polar cold, the ground continues permanently frozen at the depth of a few feet below the surface. But this frozen subsoil is found to extend only to a limited depth, on penetrating below which, the temperature gradually rises, the increasing warmth bearing (here, as elsewhere) a direct relation to the depth. This shows clearly that the heat which our globe derives from external sources, and which unquestionably exerts the most material effects upon its superficial condition (and, with that, upon the infinitely varied forms of organic being of which the earth is the dwelling-place), only affects the outer strata of its crust, regulating the temperature of a thin pellicle of our planet, while at greater depths the internal heat continuously displays its power.

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* The temperature of waters artificially derived from a moderate depth below the surface, that is, from a depth not exceeding one or two hundred feet, generally coincides with the mean heat of the atmosphere at their place of issue, and preserves a nearly equable condition of heat throughout the year; but with any considerable increase of depth the temperature of the water becomes uniformly greater, and it is found that, in very deep Artesian wells, the water invariably exhibits a degree of warmth which increases in a direct ratio with the depth.—See the observations of Arago, referred to by Humboldt, in "Cosmos" (Eng. trans. vol. 1, p. 166, &c., Bohn's edition).

The greatest depths to which the operations of the miner have penetrated are little more than two thousand feet, a very inconsiderable fraction of the earth's radius. If we are warranted in assuming (with our most able geologists) that this observed ratio of increase in the earth's subterranean heat is preserved continuously at yet greater depths, it will follow that a heat equal to the boiling point of water (212° Fahr.) must prevail at a depth of less than two miles; while at less than thirty miles below the surface, the heat would be equivalent to that at which iron melts,* and at which even the hardest rocks, such as granite, would be in a state of fusion. Hence the theory which regards the central portions of our planet as being in a state of fluidity, owing to intense heat, and which regards the present condition of its external crust as the result of a secular cooling from a former fluid (or semi-fluid) condition of the entire mass.

We are not, however, called on to acquiesce in the theory here referred to as necessary to an explanation of the phenomena exhibited in the earthquake and the volcanic eruption. The *proximate* cause of both these manifestations of the power of subterranean heat is unquestionably to be found in the various chemical changes in continual operation beneath the surface of the ground. The exact nature of such changes, produced by the mingling of various elementary substances, with their mutual action and reaction on one another, is a subject on which differences of opinion naturally prevail, and constitutes a question which is obviously beyond the reach of solution by means of direct observation; but there appears to be good reason for regarding the access of sea water as a very general (if not, indeed, a universal) accompaniment of the development of volcanic action.† The elastic gases contained in the cavernous reservoirs beneath the ground tend, under the influence of heat, to burst the covering within which they are confined, and produce, by the force which they exert, that upheaval of the solid crust of the earth which frequently accompanies the earthquake.

It is important to notice the geographical distribution of volcanic phenomena, and to mark out, on a map of the world, the regions of subterranean disturbance. In doing so, it is found that both classes of phenomena, the earthquake and the eruption, fall within the same (or nearly the same) limits. There are, indeed, widely extended tracts within which the shock of the earthquake is occasionally experienced in a modified degree, but in which no active volcanoes occur; yet, on the other hand, all the active volcanoes of modern times are found within the regions which experience frequent, and often violent, shocks of earthquake. The phenomena are, in fact, closely connected; and there is reason to regard the volcanic vent (or crater of active eruption) as constituting, in many cases, a kind of safety-valve to the region in which it is situated, the subterranean forces which pass off through its channel being thus relieved from the necessity of exerting their disturbing agencies in another mode of action. In southern Italy, it has been observed that the periods during which the crater of Vesuvius has been more than ordinarily quiescent have coincided with those during which the country has suffered most from earthquakes; and, on the other hand, the lengthened freedom from such shocks has been accompanied by eruptions of more than usual violence.

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* According to the late Professor Daniel, the fusing point of iron is equivalent to 2786° Fahrenheit.

† See Humboldt, "Cosmos," vol. i. pp. 243 et seq. With very few exceptions, the known active volcanoes are all found either in immediate proximity to the shores of the ocean or in the neighbourhood of inland bodies of salt water, and the regions most powerfully affected by earthquakes are similarly situated.

The two most widely-extended areas of volcanic disturbance coincide with the opposite shores of the Pacific Ocean. Along the entire western coast of the New World—from Tierra del Fuego to the peninsula of Alaska and the neighbourhood of the Aleutian Islands—shocks of earthquake are known to occur; and within a large portion of the space, vents of active eruption are found. The subterranean igneous force is indeed much more powerfully displayed in the southern than in the northern half of the American continent, and the active volcanoes that occur within the limits referred to are nearly all found amidst the cordilleras of the Andes, or upon the plateaux of the Mexican isthmus. Chili, Peru, and the western portions of Columbia—in fact, the whole range of countries lying along the west coast of South America—have frequently experienced shocks of earthquake of the most violent description, many of them so considerable as to occasion great and permanent changes in the level of the ground, and a few days (or at most a week or two) rarely pass away without some minor indications of the force which is at work beneath. In the Patagonian Andes—the most southward portion of the great mountain-system—four active volcanoes occur between the parallels of 44° and 42° S.; and of the Chilian Andes, no fewer than nineteen are active volcanoes. The Andes of Bolivia and Peru contain fewer active vents of eruption, and between the parallels of 30° and 23° no active volcanoes occur: but amongst the double chain of the Columbian Andes, in the immediate neighbourhood of the equator, numerous volcanoes are again found. Amongst those situated within the province of Quito, crossed by the line of the equator, is *Cotopaxi*, upwards of 18,000 feet in altitude, and the highest of the volcanoes that has been in a powerfully active condition within the modern period. Upon the western side of Central America, again, active volcanoes line the shores of the Pacific, and, further to the northward, several insulated volcanic peaks rise above the high surface of the Mexican table-land. One of the Mexican volcanoes — the mountain of Jorullo — is especially deserving of notice, from the circumstance of its having first risen above the surrounding plain by the accumulation of volcanic matter during an eruption in the year 1759.

The chain of the Aleutian islands connects the volcanic region of the eastern Pacific with that which extends along its western shores. In the latter case, however, it is upon the peninsular regions, or in the chains of islands that adjoin the mainland, that the igneous force is displayed. The volcanic region which borders the eastern side of the Great Ocean is continental, while that which skirts its western limit is insular, or else peninsular. Kamchatka, the Kurile Islands, Japan, and the entire region of the East Indian Archipelago, exhibit the presence of igneous force below the ground, in both of the forms of manifestation that we are considering. Seven active volcanoes exist in Kamchatka, and Japan is said to contain numerous burning mountains. Between Japan and the Loo-choo group is Sulphur Island, an insular volcano, from which smoke is constantly emitted. The islands of the East Indies exhibit displays of volcanic force only paralleled in frequency and intensity by the volcanic regions of the Andes. In Java alone, there are thirty-eight active volcanoes, ranging in a linear direction, from east to west, through the length of the island. Thence the volcanic chain is prolonged, in one direction, to the north-westward, through Sumatra, and as far as the burning summit of Barren Island, in the Bay of Bengal; and in another direction, to the eastward and south-eastward, through the islands of the Lesser Sunda group, and the northern shores of New Guinea, towards the western members of the Polynesian archipelago. Further to the southward, in the same general direction, it is traced in the Northern Island of New Zealand, in which slight shocks of earthquake have been not unfrequently experienced, and which contains likewise other evidences of volcanic action.

The Pacific is, then, girdled by a great chain of subterranean fire; nor are there wanting evidences of the volcanic heat being as powerfully active in the midst of the ocean's bed as upon the surface of the adjacent land. The Sandwich Islands, a strictly insular region, in the midst of the Northern Pacific, contain (in Owhyhee, the largest member of the group) one of the most powerfully active of modern volcanoes—the mountain of Kilaueh.

Another great volcanic region is traced in connexion with the waters of the Atlantic, and those of its great offset, the Mediterranean Sea. The south-western shores of Asia, the southern shores of the European continent, and the north-west portion of the African mainland, are included within the limits of this region, which extends from the neighbourhood of the Caspian Sea, on the one hand, to the volcanic archipelago of the Azores, on the other. There are fewer active vents of eruption within this region here referred to, than in those previously traced, but frequent shocks of earthquake are experienced through its entire extent. Syria, Asia Minor, Greece, Southern Italy, the Spanish peninsula, and the region of Mount Atlas, in North-western Africa, are all liable to the frequent repetition of such convulsions. The only portion of the Mediterranean coasts exempt from such disturbing phenomena is on its southern shores, embracing that part of the North-African coast which stretches between the Lesser Syrtis and the Isthmus of Suez, including the valley of the Nile. We have no record of the experience of any shocks of earthquake in Egypt. Had it been otherwise, perhaps the pyramids of that land of wonders might have proved less enduring monuments of the past.

Besides the widely-extended areas above adverted to, there occur, in either hemisphere, regions of volcanic activity, in which—though over a smaller geographical extent—the subterranean heat of our planet displays itself on a scale of equal intensity. In the northern half of the globe, the large island of Iceland, in immediate proximity to the Arctic circle, is one of these; and Jan Mayen Island, five degrees nearer to the northern pole, may be regarded as an outlying member of the Icelandic volcanic region. On the southern side of the globe, the island of Bourbon, in the Indian Ocean, displays the presence of active volcanic force in the frequent fires of one of its *pitons*. In a much higher latitude, within a distance of only twelve degrees from the southern pole, in a tract of land upon which a recent circumnavigator—our adventurous countryman, Sir

James Ross, who was its discoverer—bestowed the name of South Victoria, there is found, in immediate proximity to the snow-covered mountains and lofty glaciers which line the shores of this cold and barren region, the active volcano of Mount Erebus, rising to an altitude of more than twelve thousand feet,—a sublime object in itself, and rendered the more striking by the contrast which the aspect of its glowing summit presents to the ice and snows gathered within the polar circle.

The interior of the Asiatic continent presents us with a region of volcanic disturbance, further removed from either of the great oceanic basins than is elsewhere found. Two, if not more, among the summits of the Thian-shan chain, which stretches through Central Asia (to the westward of the Mongolian plateau, and intermediate in position between the systems of the Altai and the Kuenlun), are active volcanoes, and shocks of earthquakes are experienced in the adjacent tract of country. Over the greater part of the Indian peninsula, particularly on the northern side of the valley of the Ganges, and in the tract adjacent to the Lower Indus, earthquakes are experienced, as well as in the region which stretches between the western portion of the Himalaya and the valley of the river Oxus. In the western part of the Arabian peninsula, and upon the Abyssinian plateau, upon either side of the Red Sea, similar phenomena are experienced. In the Western Continent, the lower portion of the Mississippi valley, and some parts of the country bordering on the river and gulf of St. Lawrence, are also subject to the occasional occurrence of such shocks, though with a modified degree of intensity. W. H.

(*To be continued.*)

ON WRITING.

(*With Illustrations.*)

The remarks of a correspondent in our March number, on the teaching of writing, having led to various inquiries as to the best manual upon the subject, and requests for further suggestions, we, by permission, print a portion of a tract on the subject, by G. C. Rapier, issued some years ago, with such illustrations as are requisite, and with a few additions. We consider this tract the best practical analysis of the art; and, so far as we know, it is the only one which treats it on the analytical principle, or attempts to teach writing by other means than imitation.

The remainder of the tract consists of instructions on the angular system of writing. As we hold this to be altogether a mistake, and as tending to destroy all individual character in handwriting, we have not thought it desirable to give currency to it.

It will be obvious to the reader that we cannot give in letterpress the precise forms or proportions of the letters; our descriptions, particularly in the analysis, must therefore be taken with allowances; they will be found, in some cases, to vary from the theory laid down.

Whilst we are upon this subject we wish to express our opinion, that many masters lay too much stress upon what is called fine writing. The first object of writing is the power of communicating the ideas; for this purpose, legibility, and then rapidity, are the two great requisites. For book-keeping, or for the purpose of teaching of writing, more is of course requisite; but where this perfection is invariably required, it substitutes the mechanical for the intellectual, and is in fact a waste of valuable time that might be applied to more important subjects.

Of course these remarks do not apply universally. In a school which is professedly and absolutely a commercial school, intended for the education of clerks and shopmen, special attention to writing and arithmetic is requisite; but in national schools, and schools of a higher grade, there are other branches of knowledge which deserve greater attention.

INTRODUCTION.

The object of this little tract is twofold,—to assist teachers, and to enable persons to learn without a master.

The possession of knowledge or skill, and the power of imparting it to others, are talents so widely different that very few instances are found where they exist together. In my own experience I have met with many masters whose writing has been faultless, but who have failed completely in communicating their ability to others. This results from want of system, and from ignorance of the principles in which excellence consists. It is not enough that a teacher writes well himself, and can perceive faults in the writing of others, he must tell them *where the fault is, and how it is to be rectified.*

Those who wish to learn without a master must read the tract carefully and study the scale; the lessons must then be practised in the order in which they come.

The first step to good writing is to know in what good writing consists. The great requisites I assume to be, justness of proportion, regularity in height, equality in distance.

There are two ways of attaining these—one by imitation merely, the other by working upon a principle.

In the first case, if the thing imitated is bad, the imitation will be the same; it is better, therefore, to try and arrive at some principle which shall give an unvarying test. This principle I have endeavoured to work out, by adopting what, for want of a better name, I call

THE CARD SCALE.

This is the scale by which the dimensions and distance of the letters are proportioned; it is formed in the following manner. It may be made of any size, but the one given is large text.

Whatever size you intend the writing to be, mark off upon a card the depth, as in the letter *o* (see fig. 1), where 1 represents the edge of the card, and 7 the line for the depth.

Divide this into two equal portions as at 4, this distance will give the *inside* width of the letters as in *o*.

Divide this again as at 3 and 5, the line drawn from these points is the line in which the upper and lower turn of the letters should commence.

Divide it again as at 2 and 6, and the distance between 1 and 2 (or 6 and 7) represents the thickness of the down stroke.

To explain this in another way,—we will call the distance from 1 to 7 the whole space; the width of the letters inside should be half the space; the turn or round part of the letters should be one-fourth of the space; and the thickness of the letters one-eighth of the space.

The tops and tails of letters extending above and below the space should be equal to the depth of the space itself, that is 1 to 7, except in the case of *t*, which is only half the depth, that is equal 1 to 4; and *p*, where the *top* is the same length as that of *t*.

The letters *f*, *g*, *h*, *j*, *l*, *q*, *y*, which extend above and below the line, and are made with a loop, require to have the tops and tails carried out one-fourth more than the others (that is, the distance from 1 to 3 on the scale), otherwise they will appear stiff and inelegant.

As justness of proportion in shape and thickness are the first elements of beauty in writing, it will be necessary for the pupil to pay particular attention to this scale; and to accustom his eye to judge of intervals, so as to turn the letter at the proper point without hesitation, and to preserve the proper thickness of each stroke and distance of each letter. The sloping lines on the scale show the slope of the letters; the rule for determining this slope will be given hereafter.

POSITION AT THE DESK.

A table is preferable to a desk to write at, but persons whose sight is not good may find the latter more convenient, because they can avoid stooping, which is both inelegant and injurious.

The position should be just the same as at the dinner table, where the head is inclined just so much as is necessary to meet the fork.

Persons who are confined much to the occupation of writing are liable to so many diseases, mostly resulting from the habit of stooping over the desk or table, that a proper position is a matter of the first importance. Where the learner is a child, the feet should have something to rest upon, in case he is not able to rest them upon the floor, or he will be thrown forward with his chest on the desk.

POSITION OF THE PAPER.

The paper must lie parallel with the edge of the table, the left side of it in a line with the nose, near enough to the writer to allow him to reach it with ease. The forefinger and thumb must rest upon the paper to keep it steady as the right hand moves along.

POSITION OF THE HAND.

(Fig. 2.)

The proper position of the hand being absolutely necessary to obtain the rapidity requisite for business, the pupil must pay particular attention to the following instructions, recollecting that it will be much easier to learn the proper position at first, than to unlearn an improper one that has been contracted.

The pen must be lightly held, about an inch from the nib, between the thumb and the two forefingers; half of the thumb nail to be kept in sight, the nail of the first finger nearly all in sight, and the nail of the second finger about the same; the *heel* of the hand, or that part next the wrist, lightly touching the table; the third finger across the inside of the hand; the end of the little finger will then support the hand as it glides over the paper.

The hand must be kept in such a position that the tops of the knuckles point upwards, the top of the pen must point to the right shoulder, and the nib of the pen and the fingers must point towards the top of the paper, with an oblique inclination to the right hand corner, the pressure will then be equal on both points of the pen. The motion must be entirely from the fingers, and not from the arm.

The pen must lie between the thumb and forefinger, the tip of the thumb in close contact with the first joint of the forefinger, and the side of the second finger lying close to the first (see fig. 2). The pen should be held by the thumb and second finger, the forefinger rather resting upon the pen than holding it.

Children will not at first be able to take so long hold of the pen, they must therefore begin nearer the point, lengthening the distance gradually as they find they are able to do so.

It will not either be advisable to give the very large hand to children to commence with, an intermediate one being better suited to their command of hand.

OF THE SLOPE OF THE LETTERS.

To find the proper slope, take the card scale, make a square *A, B, C, D,* by the breadth of the card as at fig. 1, plate 1. Divide the line *A B* into four equal parts, and mark *E F G,* at the bottom. Divide *C D* in the same way at *H, I, J,* draw a line from *A* to *I,* from *E* to *J,* and from *F* to *C.*

The lines *A I, E J, F C,* which are parallel to each other, show the slope of the letters.

Copy books may be had ruled according to these principles, but the common copy books may readily be made to answer by taking the card and marking in the copy book with pencil the inclination of these lines, and ruling lines accordingly.

These lines will be a guide for the slope of the letters and a test of their proper execution; after a little practice they may be dispensed with, and the eye will be enabled to judge of the inclination of the letters without their aid.

ANALYSIS OF THE LETTERS.

The seven first figures of plate 2, consisting of strokes, turns, and the letter *o*, enter into the composition of nearly all the letters, and may therefore be considered as the *root* forms, requiring only the addition of loops or tails, or the extension of lines, as will be seen by the following description:—

a is formed by joining *o* and *ı*.

b the lower part is similar in form to *o*.

c is formed of a part of *o*. In making *c* the upper part of the dot should touch the top line, and it should be so made as to form *o* if continued round.

d is formed of *o* and *ı*, with the top prolonged. In making it, the pen should go up from the point where *o* finishes (third line in the scale), return again, and leave the *o*, at the fifth line in the scale.

e is one-half of *o* with a loop striking from the middle.

f is the straight stroke extended, and with a loop *g* is *o* with a tail. The tail should join the *o* as explained above in *d*, and in forming the tail it should be crossed a little below the bottom line.

h is a straight line extended with the last part of the letter *m*.

i should be exactly like the first stroke of *m* turned upside down.

j is the same as the last part of *g*.

k is the same as *h* with the same turn as the capital *R*.

l is the same as *b*, without the final portion.

m, *n*, *o*, require no remark.

p the same as *h*, with the straight stroke extended below the line.

q is *g* with a tail turned the contrary way.

r *r* may be made in two ways, and cannot entirely be referred to any other letter, but must be imitated.

s the same.

t is *i* extended and crossed; the cross should be on the top line.

u is *i* repeated.

v a combination of the finishing portions of *m* and *b*.

w *w* the same as *n*, with the finishing portion of *v*.

x two *c*'s back to back, the first one being upside down.

y the last stroke of *m* with *j*.

z cannot be referred to any other letter, and must be imitated.

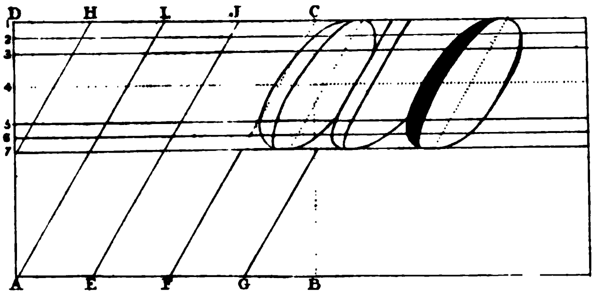
CAPITAL LETTERS.

Definite rules may also be laid down for the formation of capital letters, as well as small ones, for they are both, in nearly all cases, combinations or variations of a few elementary forms.

The pupil is referred to plate 3, where the groups of *combined* capitals will better exemplify what is meant. If he will take the trouble of examining them, he will readily be able to trace in each group the letters, as they are printed above in Roman capitals.

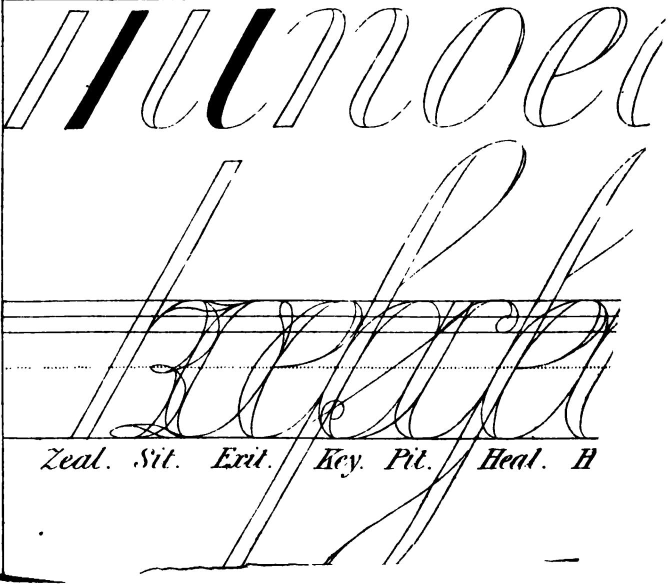
By looking these over carefully, he will see how closely many of the

Fig. 1.



THE CARD SCALE.

The distance between 1 & 2 shews the thickness of the down strokes.
3 & 5 show the point where the turn of the letters commences.
The distance between 1 & 4 shews the inside width of the letters.
1 & 7 the height of the letters.
The lines E. J. & F. C. show the slope of the letters in large hand,
Running hand should be a little more sloped.


Zeal. Sit. Exit. Key. Pit. Heal. H

letters resemble each other in some of their component parts; as, for instance, the down strokes of

B D F H I K L P R S T

are alike; and the left side curve of which *O C G H K*, are alike.

Also, the upper turning of *B P R*, and others.

This might be carried further, but there is enough to show the principle. There are some few, such as

D K Q

which cannot be wholly referred to any other letter; in some of their parts, these it will be necessary to imitate.

Capitals should be made of the same height as the letters with tops, that is, as high again as the small ones.

DISTANCE BETWEEN THE LETTERS.

The distance between letters that are joined together should be half a space (1 to 4 on the card scale), or, in other words, there should be the same distance between each letter as there is between the two strokes of *m n o*, &c., inside measure.

This, however, does not hold good in all cases; for when two hair strokes run into each other, as in

ii hy mn em

the eye requires that the distance between the two down strokes should be lessened, it must therefore be only three-fourth's of a space (1 to 5 on the scale).

The reason for this is, that the lightness of the hair stroke makes the distance between the two down strokes appear greater than it really is.

OF THE LESSONS.

Large Hand.

The learner must commence with the lessons in plate 2.

The first figure in the plate, it will be observed, is a skeleton straight stroke. A ruler must be taken, and this figure copied into the book in pencil, maintaining of course the same proportion, if the letter is of the same height. Having ruled a line of copy book full of these skeletons, he must then take a soft pen that will open freely, and having his hand in the proper position, he must trace over these skeleton lines ***slowly, without ink in his pen.***

If his hand and pen be in the proper position the points of the pen will mark each side of the skeleton equally; if it be not in the proper position, the stress will be heavier on one side than the other, and the pen will of course leave a deeper mark on one side than on the other.

After the pupil has practised these for a short time, he may then take ink in his pen; and when he can make the stroke of equal thickness from top to bottom, without being ragged, he may pass to the next lesson, which is *i*. This must be gone through in the same way, and so on through the first line, by which time he will be master of what may be called the *root* part of all the letters, for their forms join into each other in various combinations.

For the proportions of the letters, the pupil is referred to the card scale and the explanation of it before given. As a farther illustration it may be remarked, that the letter *O*, measuring inside, may be taken as a criterion of the width. This letter, either in part or entire, enters into the composition of so many of the others, that it may justly be considered the most important, and therefore deserves the greatest pains to attain its proper formation.

Round Hand.

After having gone through the lessons as given in large hand, the pupil may pass to round hand, practising copies in this hand until he has attained equal expertness. Nor will it be necessary to say anything in the way of instruction, as the same principles as to formation and proportion hold good in this as in the other.

The word *hyminuhy* given in plate 3 is good practice for the learner. It reads the same when turned upside down, and if the letters are properly formed, will have precisely the same appearance.

Notices of Books.

A CATALOGUE OF GREEK VERBS, IRREGULAR AND DEFECTIVE, THEIR LEADING TENSES AND DIALECTIC INFLECTIONS ARRANGED IN A TABULAR FORM. BY JAMES BAIRD, TRINITY COLLEGE, DUBLIN. (*Longman.*)

THIS is an elaborate work in the department selected by the author for his labours. It professes to be a catalogue of irregular and defective Greek verbs only, their leading tenses, and dialectic inflexions. But as very few verbs really are furnished with a complete equipment of tenses, this catalogue of defective and irregular verbs does in effect become a list of *all* or nearly all the verbs in common use. The main object of tabulating the salient points of grammar and syntax, appears to us to consist in the facility it provides for the absolute committal to memory of such portions as ought to be learned by rote. Where grammar is reduced to a few pages, printed in a tabular form, it is easier to insist upon a complete acquaintance with it, by all the class in which the tables are used, than when the several portions lie scattered here and there in detached parts of the grammar. And when the tables *are* learned, it is obviously an easy matter to run through them occasionally in this form, for the purpose of refreshing the memory. The irregular verbs of very frequent occurrence have already been tabulated in a useful form; the present work is an expansion of this plan, and, as we remarked before, contains almost every verb in the language. Whether this expansion has not injured the utility of the book, for the purpose to which we alluded, may be fairly questioned, as it is at present far too bulky to be committed bodily to memory. Nevertheless, it will be of considerable use, we think, in other ways. For instance, in writing Greek prose or verse, the young composer, having as yet no great experience, is inclined to think that every verb has practically every part which it ought theoretically to have, and finds subsequently that he has used a tense which, for all practical ends, does not exist, or is only found in those great sepulchres of dead forms, the old grammars. These tables will be for him exceedingly useful; he will refer to his list, and from the tenses actually in use in the best authorities, will select that which possesses the required shade of meaning. The late forms and the epic varieties are carefully noticed, so as to preclude their undistinguishing employment in pure attic writing. Remarks are also added, when necessary, upon the existence of any anomaly, in the case of the verb in question. Verbs of *very rare* occurrence, or *very* defective in their tenses, are classed separately, under Part II. There is also an Appendix of some length, containing about all the information that can be given in the way of verbs, their augments, reduplications, syncopated forms, and the like; paradigms of verbs in *μι*, and contracted. In short, nothing on the subject likely to be of use has been omitted, and a vast amount of care and labour has been expended on the book, and great accuracy striven after.

CICERO DE FINIBUS MALORUM ET BONORUM. ARNOLD'S SCHOOL CLASSICS. (*Rivington.*)

THIS is an edition of a portion of Cicero's writings, not very frequently read in our schools or universities. In the latter case, the increased study of the treatises of Plato and Aristotle, especially the "Ethics" of the latter, may have caused Cicero's work to be neglected of late years; and with respect to its adoption in schools, the nature of the subject forms a considerable obstacle to its general reception. The "Officia" of Cicero is a more popular and exoteric treatise on some of the principles of morality, and, from its more superficial character, is better fitted for the class of younger readers. The "de Finibus" is a more elaborate and philosophical work, going far deeper into the springs of moral conduct, and consequently interesting in no small degree, as conveying to us an idea of the progress made up to the time of the writer, in the department of morality; containing, as it does, an extremely full account—almost, indeed, the fullest we possess—of the history of moral philosophy. It is satisfactory to be able to trace the views on this subject held by the wisest of the heathens, and to compare them with our own, holding, as we do, in our hands, a lamp of truth which was denied to them. But however interesting to the more thoughtful scholar, such a treatise is hardly likely to suit younger readers, found in our schools. The subject is one of considerable difficulty, and the reasoning close and subtle, and hardly appreciable by boys, who, usually speaking, take little interest in such matters. Now we confess we do not think this edition of the work in question, under the auspices of Mr. Arnold, is particularly adapted to remove this difficulty, or promote the study of the treatise. The compiler of the notes appears to have forgotten that he was preparing a school edition of, in this instance, a somewhat difficult writer. Passages that should have been explained have been continually passed over, and the notes encumbered with a vast amount of information about *readings* and so on, which are utterly useless for those who are intended to use the book. It would hardly be too much to assert that the staple of the notes consist in remarks such as these:—*propterea,* Erl. Spir. marg. Crat.; *proprie,* Gud. 2. Bas.; *Infame,* Pal. 1, 3, marg. Crat. C. C. C.—annotations of which we cannot, for the life of us, see the utility. The only *really* useful part, we take to be the analysis prefixed to the notes, and that does certainly supply the help boys are especially in need of in such works. Otherwise, we must pronounce the edition a very unsatisfactory one.

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1. MY FIRST SCHOOL BOOK TO TEACH ME READING AND WRITING. BY WALTER M'LEOD.
2. SIMPLE TRUTHS IN EASY LESSONS.
3. HISTORY OF ROME. BY THE REV. R. W. BROWNE, M.A. GLEIG'S SCHOOL SERIES.

(London: *Longman & Co.*)

THE plan of the first of these books presents quite a novelty to the infant teacher. It gives the usual little monosyllables of a child's first book in written characters on one page, and in the common typographical on the other. There is however a preliminary page containing all the hieroglyphics of such a system of writing as that known as Mülhauser's, with all its combinations of hook, right line, link, and curve. Before the child is allowed to proceed to the reading lessons, he is made to go through the motions of producing and reproducing this page upon his slate till accuracy has been acquired. At the same time, as recommended in the introduction, "the names of the lines should be taught simultaneously with their formation." Had not the name of Mr. M'Leod been attached, we should have put this book down to the account of some mere theorist. Had the writer confined himself to the preparation of a book to teach adults to read and write simultaneously, his object might have been attained. The master in one of our metropolitan prisons has introduced the plan with very fair success: but we do not think it applicable to infant schools.

"Simple Truths" looks almost like a sequel to "My First Book," but it is not apparently edited by Mr. M'Leod. The most noticeable feature in it is the peculiar facility with which the writer has reduced the simplicity of Scripture narrative into careless and uncouth jargon. We give examples of the general style, as indicated in the first few pages:—

> "But the fruit of one tree they were told not to eat, from the day they *ate* of it they should die."
>
> "For this God drove him from his father's house, and he *took root* with his children in a far-off land."

Again—

> "His brother Ishmael left the tent of Abraham; and, with his mother, *took root* in the desert."

These "Simple Truths" rob Topsy of the originality of her idea, when she answers, "I 'specks I grow'd." But to proceed—

> "And God forced them to leave off this made scheme, and to spread through the world, for he made them *speak so strange, that when one spoke, the next could not tell what was said.*"
>
> "The first time Esau sold it for a mess of pottage. He was faint for lack of food, and cared more for the meal than for the blessing. *The next time was a darker case,* and must be told more at length."

The "History of Rome" is a work that does credit to the series. Without any pretensions it is written in a pleasing and easy style, and is well suited to the capacities of scholars in those classes in which ancient history is read. Mr. Browne commences with a geographical description of Italy, gives an outline of its geological formation, and an account of the early inhabitants of Latium. After giving a judicious selection of the facts from which the fabulous history of early Rome has been founded, the author encounters its ancient legendary history.

THE ELEMENTS OF EUCLID, BOOKS I.—IV., XI., 1—21, XII., 1 & 2; A NEW TEXT, BASED ON THAT OF SIMSON. EDITED BY HENRY J. HOSE, B.A., MATHEMATICAL MASTER OF WESTMINSTER SCHOOL, AND FORMERLY SCHOLAR OF TRINITY COLLEGE, CAMBRIDGE. (London: *Whittaker and Co.*; *G. Bell.*)

ELEMENTARY publications are now multiplied to a great extent. The lists of new books, or of new editions of books recorded in our weekly and monthly periodical literature, furnish abundant evidence of the rapid increase of elementary works in all departments of useful knowledge; and the principal object which the writers of these elementary books have in view is either to smooth down the asperities which are still to be met with in the pathways of science and art, and thus facilitate the progress of the student, or to establish, in a more rigorous and satisfactory manner, the leading and fundamental principles of scientific investigation.

The Elements of Geometry, as compiled and arranged by Euclid more than two thousand years ago, is a production of the highest excellence. The lapse of twenty centuries has not lessened its intrinsic greatness; and it still retains the pre-eminent position it has so long occupied, not only in the seats of academical learning throughout the world, but in the hearts and homes of self-taught students in every civilized country. Simson's edition of this celebrated work has been recognised as the best for many years past; and the editor of the one we have now to notice has judiciously based his text on that of Simson.

A distinguished mathematician, in speaking of Simson's edition, says, "With the exception of the editorial fancy about the perfect restoration of Euclid, there is little to object to in this celebrated edition. It might have been expected that some notice would have been taken of various points on which Euclid has evidently fallen short of that formality of rigour which is tacitly claimed for him." Mr. Hose has endeavoured to supply the deficiency alluded to; and it has been his aim to restore such "formality of rigour" in all places where it seemed wanting, and to render both text and figures as accurate as he could.

In the preface the editor remarks, that "no step has been omitted in the propositions, or left implied; the text has been made clearer and more symmetrical by marking the divisions into cases, and stating similar pieces of reasoning, as far as may be, in the same words; and a new set of figures has been drawn, the thick lines of which are those that are given in the enunciation of a proposition, and the thin such as are afterwards made use of in the construction or proof."

Mr. Hose's edition of Euclid's Elements of Geometry is a good one; containing, besides the first six books, all the propositions in the eleventh and twelfth books that are usually studied at Cambridge, and its new features are the novelty of the diagrams with thick and thin lines, and the excellent proofs of all the corollaries which Simson left without demonstration.

AN ATLAS OF SCRIPTURE GEOGRAPHY; ADAPTED FOR THE USE OF TRAINING COLLEGES, PUPIL TEACHERS, AND THE UPPER CLASSES IN ELEMENTARY SCHOOLS. WITH ILLUSTRATIVE LETTER-PRESS, BY WALTER M'LEOD, F.R.G.S., HEAD MASTER OF THE MODEL SCHOOL, AND MASTER OF METHOD, ROYAL MILITARY ASYLUM CHELSEA. THE MAPS COMPILED AND ENGRAVED BY EDWARD WELLER, F.R.G.S. (London: *Longman, Brown, Green, and Co.* 1853.

This work consists of ten large 4to. maps, folded in octavo, comprising in all fifteen maps or plans, and about fifty printed pages of letter-press. The engravings are executed on steel, in a plain but very neat style, and are well coloured; they are not so filled with names as to confuse the student, but will afford a sufficient guide in his studies.

The letter-press, so far as it relates to Palestine, is for the most part an epitome of Mr. M'Leod's valuable little work on the geography of that country. That which refers to Armenia, Mesopotamia, and other Bible Lands, is also a neatly epitomised account of those lands. The whole is arranged so as to correspond with the sequence of the respective maps. At the end of the work is an alphabetical index of upwards of 1200 names used in the maps, with the latitude and longitude given. The Atlas may be used with a great advantage by those for whom it is compiled.

NATIONAL EDUCATION; A SERMON, BY F. D. MAURICE, M.A., CHAPLAIN OF LINCOLN'S-INN. Pp. 22. (*J. W. Parker.*)

This sermon was preached in aid of the funds of the National Society, before the pupils of the Training College of St. Mark, Chelsea, and was published at the request of the Principal. Its design is to impress upon the members of that institution the serious responsibility which arises from the power placed in their hands, and that it is ignoble to complain of injuries inflicted by governments, whilst they possess that power, which, but for disputes and jealousies, they might exercise for the benefit of the whole land. They are reminded that the government of the country, when it enencourages subscriptions in their behalf, or on behalf of the society from which they have sprung, regards their college as founded with the view of forming them to be instruments in giving vigour, consistency, and stability, to England as a nation. He remarks that the National Society has laid down laws for itself, which are open to different interpretations, and to objections from various quarters, but that these laws may be understood clearly enough, if they try to conform to them and execute them; and that they will be able to defend themselves better in practice and trial, than by arguments. He then observes that—

> "The proposition that the National Society is formed to bring up children in the principles of the Church established in England and Ireland, leads a great many of our countrymen to deny that it deserves its name. 'Such an object,' they say, 'is not national; it is exclusive and sectarian.' I have not found it easy to encounter this objection by any abstract reasonings. I think, when you hear it, you will do well to abstain from them. Every one of us knows that he is inclined to be sectarian; that he may become so altogether. It is a disease of the heart which he has to fight against night and day. It is a disease which may assume all variety of forms, which may exhibit the most changeable symptoms. Never suppose that sectarianism may not hide itself under any form of language, or that those are wrong and unjust who tell you that it does hide tself under this form of language; nay, that in our case this may be the one which it

> adopts most readily and naturally. As long as the words 'Established Church' are merely watchwords to us, which we use by way of distinguishing ourselves from other people, they will denote the narrow sect-feeling which possesses us; they will foster and increase that feeling. But the National Society directs that we should *educate* the children of its schools in the *principles* of the Established Church. Just so far as we do that, just so far as we are educated in principles, they cease to be watchwords; it is only while they are outside of us that they can serve that purpose. When they are formed in us, and we are rooted in them, we come to feel it a shocking and profane contradiction to make them into excuses for strife or vainglory. We may do it. But instead of our consciences telling us that we are better churchmen for doing it, they reprove us for our inconsistency, they reproach us as they would for being guilty of some evasion or dishonesty."

The preacher then proceeds to illustrate and justify these remarks, by giving an outline of the principles contained in the Church-manual, which the National Society directs its members to use. He shows how utterly at variance those principles are with a sectarian and exclusive temper, and he contends that they are therefore fit to build up a nation of right and true men. He remarks that the National Society has not set up a system of its own and claimed assent for it, but that, having found one already established, its object has been to try to teach our youth that there is that provided for them which they did not make, the meaning and principles of which they are gradually to understand and enter into, but which they must begin by confessing to exist. And he warns the young men that they will not fulfil their task as teachers, according to the rule laid down for them, if there is not a distinctly English character in their teaching. That to this end, they must be in sympathy with the homely substantial character of our people, and be ready to make great efforts, and even considerable sacrifices of their own inclinations and opinions. But he adds, that he does not mean sacrifices of conscience, and that he hopes they all know that conscience and opinion are not the same, and that a man in a thousand cases must give up his opinion, in order to satisfy the demands of his conscience.

THE BOYHOOD OF GREAT MEN, INTENDED AS AN EXAMPLE TO YOUTH.

Pp. 378. (*D. Bogue*).

THE subject-matter of this book is its principal recommendation. The early days of great men can scarcely fail to interest any reader, especially the young. And they are not only interesting but instructive. They generally show, as is the case in the instances recorded in this selection, that distinction is rarely attained in any pursuit without persevering and diligent devotion to it, however highly gifted and richly endowed by nature the individual may be. One very judicious feature of this selection of examples is, that not more than two or three are given under the different heads of Poets, Historians, Lawyers, Mathematicians, Chemists, Musicians, Painters, Surgeons, and so forth. It is thus shown in a practical form, that it matters not what the profession or pursuit may be, but that in one and all there is need of a resolute purpose and patient exertion in order to insure success for the best abilities, and that, aided by these, even moderate abilities rarely fail to attain a fair measure of it. We cannot express entire approbation of all the sentiments contained in the work, nor speak very highly of the manner in which it has been executed, but both its object and its subject entitle it to our notice and recommendation, and render it an acceptable present for youthful readers.

Correspondence.

CERTIFICATES OF MERIT.

SIR,—In my letter to you last month I made a complaint, and one the justice of which will be pretty generally acknowledged, on behalf of the untrained and uncertificated, yet deserving and efficient national schoolmaster. I will now proceed to propose two methods, by the adoption of either of which, in a great measure, injustice towards him would be obviated. By the first he would be able to obtain a *real* certificate of merit; by the second he would be enabled to compete, with a greater degree of prospective success, for what is *now* termed a certificate of merit.

First then in cases in which masters are disinclined to pass the usual government examination, or when they are so far advanced in years as not to be likely to fit themselves for all the technicalities requisite for such an examination, an appeal should be made on their behalf to the Committee of Council on Education, by the clergyman of the parish and the committee of the school, where there is one, countersigned by the inspector of the district, to allow an honorary certificate. All the honours and emoluments should attach to such a diploma. The same restrictions could be placed upon the receipt of augmentation of salary as upon that of the present certificate. A sufficient guarantee that the master had performed his duties with credit and success for a series of years would be afforded in the fact that the clergyman and committee had made the application. No abuse that the inspector and manager could not control would arise out of such an arrangement, and many a hard-working and good master would receive the reward to which, on the comparison of his school with others, he is justly entitled.

The second plan to which I would call attention differs in detail only from the one at present in operation. The subjects may be the same generally, and almost as numerous, but the master would have something definite upon which to ground his anticipation before putting himself into the awkward position of undergoing an examination. A text-book on every subject in which the teacher is to be examined should be selected, and in the examination adhered to. The system pursued by the Commissioners of National Education in Ireland appears to work well, and it is certainly calculated to bring little or none of the disappointments experienced by *many hundreds* of masters in England. There are four grades of attainment defined for the masters,—that of probationers, third class teachers, second, and first. An aspirant for any of the classes knows, by a reference to the regulations, exactly what position he is likely to acquire, and, consequently, the degree only he should endeavour to obtain till after further study. I subjoin the statement of the requisite qualifications to entitle a master to the second class certificate.

They will be required :—

1. In *Grammar and Spelling.*—To write grammatically, and with correct spelling and punctuation, the subtance of an easy lesson read twice over.
2. In *Geography.*—To know the general geography of the great divisions of the globe, the geography of the British empire, and of Palestine.
3. In *History.*—To be acquainted with the outlines of general history.
4. In *Natural Philosophy.*—To possess some knowledge of the elementary principles of mechanics, hydrostatics, pneumatics, optics, and physiology.
5. In *Geometry.*—To know the first and second books of Euclid.
6. In *Mensuration.*—To be familiar with the rules for the measurement of solids, the principles on which these rules depend, and with the elements of land surveying.

7. In *Algebra*.—To know the elementary rules, and be able to solve simple equations.

8. To be prepared for examination on the subjects treated of in—

Fifth Book of Lessons, section 2, 3, 4.
Introduction to the Art of Reading, Part II.
Sulivan's Geography Generalized.
Epitome of Geographical Knowledge, Book III., and Period VII. of Book IV.
Board's or Thomson's Treatise on Arithmetic.
Thomson's Euclid, Books I. and II., with Exercises thereon.
Thomson's Algebra, Chapters I., II., IV., and VIII.
Board's Mensuration, sections 4, 5, 6, and 11.
Lessons on Reasoning, Parts I. and II.
M'Gauley's Lectures on Natural Philosophy, Vol. I., Chapters I., II., III., IV., and first 54 pages of Chapter V.

Were a plan similar to this adopted in England, we should have few failures and no dissatisfaction. I should be sorry to subscribe *in toto* to the sentiment expressed by Boswell, in his Life of Dr. Johnson. After some qualifying phrases, he says, in reference to teachers, "Yet I am of opinion, that the greatest abilities are not only not required for this office, but render a man less fit for it." It is found in practice, however, that the power of communicating instruction is not necessarily an accompaniment of the power of acquiring knowledge.

A TRAINED CERTIFICATED MASTER.

SUGGESTIONS ON THE CULTIVATION, MANAGEMENT, AND PRESERVATION OF THE VOICE.

(*Continued from p.* 142.)

[The following remarks, addressed to Clergymen, have been published in *The English Churchman*. We extract them as being useful and suggestive to Masters.]

We have hitherto considered the right use of the mechanism of the voice. But that mechanism may be perfectly used, and yet reading may be perfectly mechanical, and may wholly fail of its greatest object.

Expression is the soul of reading, and its object is two-fold; firstly, to act upon the feelings; and, secondly, to direct the understandings of men. And seldom is either duly studied in our public reading. What can be more common than to hear the commencing words of our exhortation to united worship—"Dearly beloved Brethren"—read in a tone and manner that would be fitly followed by such a parenthesis as this—(I call you so because it is so in the book). And what beginning can be more hopeless, or more disheartening to the worshippers? What more hopeful than an earnest and affectionate delivery of these words?

It is when the feelings are appealed to that action is important. Calm and subdued it should be in the house of prayer, but it is not therefore of trivial importance. How great the difference in this case, whether the speaker's eye be on the book, or on those whom he addresses! It is not possible for one who speaks these words as the real expression of his own heart, to hurry on without a pause to what he has next to say: that pause will give time for the hearers to feel that what follows is in earnest.

This is but an instance of the importance of expression to the feelings; but it is the best instance; it reminds us that we must learn to feel ourselves, in order to speak to the feelings of others. And he who has taken due thought to commence impressively, and with feeling, will have got a clue to the study how to proceed in the same spirit.

Expression to the understanding requires perhaps still greater thought and reflection. The *speaker* knows what he means to say, and gives it some suitable expression by a kind of intuition; but the *reader* seldom does so without careful study of what he reads: because the thoughts are not his own, and it requires more pains to enter fully into the thoughts of another than to perceive the force of those which rise unbidden in one's own mind. The first requisite is, to have studied the real force of what we read; the second, to have considered the means of pointing it out to others. In the first, most readers of our Liturgy are evidently deficient. It is impossible for a thoughtful person to listen to most of our readers, and not to feel that the reader would be astonished if the true force of many passages which he has spent years in reading were now at length pointed out to him. What an effect must this have in disgusting the minds of those who have studied, and who comprehend our Liturgy! And of how much instruction must it deprive those who have not! The first requisite to read the Liturgy for others, is to have entered ourselves into the comprehension of its meaning. The second is to know how to express to others that which we comprehend ourselves. Emphasis is to the understanding what tone and manner is to the feelings. By it we direct the understanding to the meaning of what we read.

All practised writers, who write for the comprehension of the masses, know the importance of italic letters in right places. There is nothing which young writers are apt to abuse more flagrantly; nothing in which greater knowledge of mankind is necessary, to know how to use it to elucidate, and not to perplex, by suggesting a useless search. Emphasis is to reading what italics are to writing; only that being capable of degrees, it may be used where the other must be forborne.

Emphasis consists in a more forcible pronunciation of certain words. A twofold, and graduated use of it may be distinguished—1st, to determine one sense, when the words themselves may be capable of two; 2ndly, to give weight to the leading idea, when the words express one sense only.

An instance of the former, and a strong one too, may be found in the words, "Deal not with us *after* our sins." It is quite possible by a strong emphasis on AFTER, and a lesser one on *our*, to make every one comprehend that "after" means "according to." And in this power of varying the emphasis lies its superiority to italics: a judicious writer would mark *after* with italics, but not *our*, because he cannot vary the intensity.

And even where no double meaning is to be guarded against, yet a variation of intensity is required. We have sometimes to contrast an idea with its opposite; sometimes only to give it a prominence above the words that surround it.

An instance of both, and of popular misreadings too, may be found in the sentence so usually read as introductory to our Morning and Evening Service—"Enter not into judgment with Thy servant, O Lord, for in Thy sight shall no man living be justified." What more simple, apparently, than to read these words? Yet, if we consider the depth and force of the lessons contained, and the evident inattention to them in ordinary reading, what more deplorable!

"Enter *not* into judgment," as it is generally read, implies a request to enter into something else: yet what follows is a reason, not a contrast. To read thus, is practically the same as to preach to the people, "Do not regard the connection of this verse." Again, "with Thy *servant*," expresses, "but with those who are *not* Thy servants," than which nothing can be further from the thought intended to be suggested. These words intend no contrast, but a sense of the terrors of the Lord, and this should be expressed by such an emphasis on the word "judgment" as may give it prominence, without suggesting the search after a contrast. "For in Thy *sight* shall no man living be justified." If such emphasis have any meaning, it suggests that in God's hearing, if we keep out of His sight, we may be excused: whereas the words are meant to express the awful difference of the sight of God and the sight of man. Many there may be before us whose worldly regularity is applauded of men, whose conscience may yet feel the force of the expression, "in *Thy* sight shall no man living be justified." To this, therefore, an emphasis expressive of contrast should be given. And in the words "no man living," the force of the word "living" is plainly equivalent to "No, not one;" to this, therefore, prominence should be given.

This same sentence gives occasion for the expression of the feeling of reverence in the words "O Lord." In speaking these words the reader is addressing the Almighty; to do this in an irreverent manner, with as little ceremony as if he were calling the sexton of the church, is very like taking God's name in vain in His own service. The people will hardly reverence the name of God, where the priest sets no example of it. The words should be spoken so that the people may feel, this man is addressing his God; a slight pause before and after, with a dwelling somewhat longer on the vowels, marks the reverence of invocation.

It is not only possible, but it is a solemn duty, in thus reading our Liturgy, to teach the people in the simplest and most natural way the deep and awful lessons it contains. Such reading does teach indeed. And, considering how many of our congregations are uneducated persons, more susceptible of impression than of instruction, more open to conviction than to reason, a thoughtful person will find much reason to conclude that in studying thus to comprehend and to express the lessons contained in our Liturgy, we may be able to give them more suitable instruction, a greater depth of feeling, a deeper conviction of the relation in which they stand to God, than we shall commonly be able to do by any sermons we are capable of preaching. But if we add to this, how much more hopeful it is to preach to those whom we have led to pray, what stronger inducement can we have to learn to give effect to our Liturgy.

The method of learning thus to do so is a subject of no light import.

Follow almost any reader through our prayers, underline the words on which he lays his emphasis (and would that many would get some faithful friend to do this for them), then take the book home, and consider what light had been thrown upon the meaning by such emphasis,—and what a deplorable opinion should we form of the evil done, and the instruction lost! in nine cases out of ten we should find the marks chiefly under prepositions and monosyllables, or even syllables, near the end of a sentence, or its members, to the utter confounding of all sense and meaning.

The recurrence of false emphasis in fixed places gives some clue to the cause. As the absence of true emphasis arises from want of appreciation of the meaning, so false emphasis is mainly induced by an abuse of the mechanism of the voice. The latter habit must be corrected in the first place. While training the organs of the voice by the methods we have already considered, the reader should aim at reading in an even manner without emphasis at all. As wrong habits are thus overcome, he may acquire right ones; as he studies the deep meaning of our Liturgy, and the solemn thoughts and feelings which that meaning is so well calculated to suggest, let him watch where he can convey such light to others by making a contrast, and giving prominence to a leading idea; and let him carry this out with caution and restraint. He cannot do it except as he gets rid of false emphasis. Above all, let him guard against the habit of dwelling on penultimate monosyllables. It is one of the few faults of this kind that appear in ordinary conversation, which shows how hard it is to avoid it. How often do we hear, "Lord have mercy *upon* us." Now, if two books lie one on the other, and I send a person for the uppermost, I say "the book which is *upon* the other; I mark the word *upon* to impress the contrast between "upper" and "under." Is that what we mean in "Have mercy *upon* us?" If not, the emphasis is absurd, and suggests a false meaning, or hides a true one.

A few such instances may serve for a guide. Study alone can give success. It might be a valuable exercise to contribute papers to this journal on the true reading of particular passages; but let the practical reader be aware of the difficulty of his real task. Mental and physical fatigue will be the first fruits of his exertions,—an efficient ministry, without fatigue, his ultimate reward.

Great physical weakness obliged the writer of this to learn something of this method; and, although thereby prevented from realizing what he has learned to conceive, he feels that he now owes to it the power of being yet able to read,—happy will he be if his own painful experience should be of use to others in attaining to a proficiency of which he is not capable.

CHURCH SCHOOL TEACHER'S ASSOCIATION.

There has lately been established at Doncaster a Church School Teacher's Association, which seems to be worthy of imitation. We give a condensed statement of its objects, for the sake of the suggestions it contains, and with the hope that it may encourage others, both clergy and laity, to assist in establishing similar associations in districts that can be so brought together.

The most interesting and instructive feature is a monthly paper, or lecture, on some subject connected with practical education; this is followed by a discussion, those members who either differ from the views thus introduced, or whose experience has enabled them to confirm such views, making their observations. Another of the important features of the association is the establishment of a library and dépôt of school-books, consisting of theoretical and practical works on education, a collection of diagrams, educational models, maps, and other mechanical aids to education; some of which will be allowed to circulate among the members, under certain regulations. The object of the library and dépôt is not only to accumulate therein all valuable school-books, and thus to enable teachers and clergymen to see specimens of books and other apparatus for instruction, before ordering them for their schools, but also, in the course of a short time to deposit there such lecturing apparatus as shall enable village schoolmasters to hold occasional meetings of the parents of their scholars, and to bring under their notice by turns the sublime truths of astronomy, the works of chemistry, the records of antiquity, the present and past condition of the earth, the construction of machines, the application of heat, water, steam, electricity, and their effects. Populous villages possessing an intelligent schoolmaster, aided and encouraged by the clergyman of the place, will thus in a degree participate in some of the advantages hitherto almost wholly confined to towns. Every care is to be exercised to keep the library of specimens supplied with a copy of every elementary school-book whose publisher or author is favourably known; and from the judgment and experience of the parties who have devoted their time to the object, there is no doubt that it will be thoroughly carried forward. The second formal meeting of this association was held on Saturday, February 12th, when an opening address, on the subject of education, was delivered by the Rev. Dr. Sharpe, vicar of Doncaster, the reading of which elicited an interesting discussion on several points touched upon in the address. At this meeting, which was attended by the Rev. Mr. Watkins, one of her Majesty's inspectors of schools, a long conversation was held on the subject of the library and dépôt. The minutes of the lords of the council were read with reference to grants, but it was ascertained that the advantage was so small to the association, in its present state of infancy, that any application would be better deferred unless it could be represented as a special case. Mr. Watkins, however, engaged to make an application, from which he trusted some ultimate advantage might be derived. The subject of the library was then referred to a committee appointed for that especial purpose; and they made an immediate application to all the large publishers of school-books, for donations of books and maps, as specimens, detailing the objects, and the ultimate advantage that might eventually accrue to the publishers themselves, by thus bringing their publications under the continual observation of schoolmasters, and others interested in promoting education. This application was very favourably received by various publishers, who have contributed valuable collections of works which could not have been purchased by the association. The announcement of these handsome donations was one of the gratifying features of the meeting. Another was, that the Archbishop of York had accepted the office of patron, and had promised a donation; and that the Archdeacon of York had accepted the office of vice-patron, and sent an annual subscription. The Rev. Mr. Watkins also reported the result of his correspondence with the Committee of Council on Education, which was highly satisfactory, inasmuch as it gave the association the privileges the former minutes conferred, for half the previous amount. After the current business of the meeting was transacted, Mr. Baker, the secretary, read a paper on teaching reading, which was received with much approbation. Cordial votes of thanks were then passed, to be transmitted to the publishers who had already forwarded collections of books, maps, &c., and to those who had promised to promote the interests of the association by similar gifts; and the committee appointed at the present meeting was requested to make immediate arrangements for the convenient and accessible disposition of the books and maps received. It was also announced that the Rev. G. Clark would read a paper on the teaching of etymology at the next meeting of the association.

ANSWERS TO THE MATHEMATICAL QUESTIONS.

QUES. 167.—*Proposed by Mr. W. H. Levy, Shalbourne.*

If the base of any plane triangle be equal to half the sum of the other two sides, then will the perpendicular on the base from the opposite angle be equal to three times the radius of the inscribed circle.

Answered by Mr. S. Dyer, Mr. W. Godward, jun., Mr. Levy, and Mr. Lovell.

Let a, b, c be the three sides of the triangle, p the perpendicular on the base, a, from the opposite angle, and r the radius of the inscribed circle; then $ap = r(a+b+c)$, for each is equal to twice the area of the triangle; but by the question $b+c=2a$; therefore $p = 3r$.

QUES. 168.—*Proposed by Mr. John Smith, Manchester.*

$$\left.\begin{array}{l} \text{Given } x^2 + y^2 = a^2 \quad . \quad . \quad . \quad (1) \\ \text{and } x \sin \alpha + y \cos \alpha = a \sin \beta \; (2) \end{array}\right\} \text{ to find } x \text{ and } y.$$

Answered by Mr. J. Brookes, Mr. J. Godward, E', and A. G. P.

Subtracting the square of (2) from (1) we have

$$x^2 \cos^2\alpha - 2xy \sin\alpha \cos\alpha + y^2 \sin^2\alpha = a^2 \cos^2\beta;$$

$$\therefore x \cos\alpha - y \sin\alpha = \pm a \cos\beta \quad . \quad . \quad . \quad (3).$$

Eliminating y between (2) and (3), we get

$$x = a\cos(\alpha - \beta), \text{ or } -a\cos(\alpha+\beta)$$

and eliminating x from the same equations,

$$y = -a\sin(\alpha - \beta), \text{ or } a\sin(\alpha+\beta).$$

QUES. 169.—*Proposed by Amicus.*

Find the value of x corresponding to the maxima or minima values of

$$2x^3 - 3(a+b)x^2 + 6abx + c;$$

and distinguish the maxima from the minima values.

Answered by Mr. W. Godward, jun., E', and A. G. P.

$$\text{Let } u = 2x^3 - 3(a+b)x^2 + 6abx + c,$$

$$\text{then } \frac{du}{dx} = 6x^2 - 6(a+b)x + 6ab,$$

$$\frac{d^2u}{dx} = 12x - 6(a+b).$$

If we put $\frac{du}{dx} = 0$, we obtain $x = a$, or $x = b$,

when $a > b$, and $x = a$, $\frac{d^2u}{dx^2}$ is *pos.*, and u is a *min.*

. . . . $x = b$, $\frac{d^2u}{dx^2}$ is *neg.*, and u is a *max.*

when $a < b$, and $x = a$, $\frac{d^2u}{dx^2}$ is *neg.*, and u is a *max.*

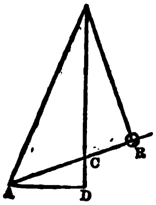
. . . . $x = b$, $\frac{d^2u}{dx^2}$ is *pos.*, and u is a *max.*

QUES. 170.—*From the Senate House Problems for* 1852.

A string nine feet long has one end attached to the extremity of a smooth uniform heavy rod two feet in length, and at the other end carries a ring which slides upon the rod. The rod is suspended by means of the string from a smooth peg; prove if θ be the angle which the rod makes with the horizon, that

$$\tan\theta = 3^{-\frac{1}{3}} - 3^{-\frac{2}{3}}.$$

Answered by Amicus.



Let C be the middle point or centre of gravity of the rod AB, then when the system is in equilibrium, the rod AB and ring R, being both smooth, PR will be perpendicular to AB, and since the peg P is also smooth, the tension of the string will be the same throughout, and therefore the string will make equal angles with PC, which will be vertical. Draw AD perpendicular to PC, then $\angle$ APC = CPR = DAC = θ, and

$$\tan\theta = \frac{CR}{PR} = \frac{AC}{AP} = \frac{AC+CR}{AP+PR} = \frac{AR}{9}$$

$$\therefore AR = 9\tan\theta, CR = 9\tan\theta - 1, PR = \frac{CR}{\tan\theta} = \frac{9\tan\theta - 1}{\tan\theta},$$

$$\text{and } AR = PR\tan 2\theta = \frac{9\tan\theta - 1}{\tan\theta} \times \frac{2\tan\theta}{1 - \tan^2\theta} = \frac{2(9\tan\theta - 1)}{1 - \tan^2\theta};$$

$$\therefore 9\tan\theta = \frac{2(9\tan\theta - 1)}{1 - \tan^2\theta}$$

which reduces to $\tan^3\theta + \tan\theta = \frac{2}{9}$;

and this solved by Cardan's rule gives

$$\tan\theta = 3^{-\frac{1}{3}} - 3^{-\frac{2}{3}}.$$

LIST OF MATHEMATICAL ANSWERS.

Amicus, ans. 170; John Brookes, Manchester, ans. 167, 168; Samuel Dyer, Wanstead, ans. 167, 168; E′, Great Stukely, ans. 167, 168, 169, 170; John Godward, Chelsea, ans. 167, 168; William Godward, jun., Chelsea, ans. 167, 168, 169, 170; W. H. Levy, Shalbourne, ans. 167; James Lovell, Chatten's, ans. 167, 168; A. G. P., Herts, ans. 167, 168, 169, 170; T. T. Wilkinson, Burnley, ans. 170.

NEW QUESTIONS,

TO BE ANSWERED IN OUR NUMBER FOR JUNE, 1853.

QUES. 171.—*Proposed by Amicus.*

Find x from the equation—

$$\sqrt{\left(abx - \frac{bc}{x}\right)} + \sqrt{\left(ac - \frac{bc}{x}\right)} = ax.$$

Ques. 172.—*From Hann's Trigonometry.*

If O be the centre of the circle inscribed in the triangle ABC, and R, r, the radii of the circumscribed and inscribed circles, then

$$OA^2 + OB^2 + OC^2 = ab + ac + bc - 12\,Rr.$$

Ques. 173.—*From Todhunter's Calculus.*

If a rectangular piece of pasteboard, the sides of which are a and b, have a square cut out of each corner, find the side of a square that the remainder may form a box of maximum content.

Ques. 174.—*Proposed by Mr. T. T. Wilkinson, Burnley.*

Given the radii of the inscribed and circumscribed circles, to construct the plane triangle when the sides are in arithmetical progression.

⁂ It is particularly requested that all mathematical contributions be forwarded, at *latest*, by the 20th of each month.

GENERAL EXAMINATION OF TRAINING SCHOOLS.

EASTER, 1853.

(*Continued from p.* 148.)

CATECHISM, LITURGY, HISTORY, OF THE CHURCH OF ENGLAND.

Section I.—1. In what names is Baptism performed? What special attributes does the Catechism attach to each of those names, and from what authority does it derive our knowledge of those attributes?

2. "A *member* of Christ, a *child* of God, and an *inheritor* of the kingdom of Heaven."

Explain the meaning of, and connexion between, the words in Italic.

3. Why is Baptism performed only once for each person, while, on the other hand, the Lord's Supper is to be frequently celebrated?

Frame your answer, as far as you can, with reference to the actual words and similitudes used in the Catechism.

Section II.—1. Explain the connexion with other parts of the Catechism in which the

Apostles' Creed,
Ten Commandments, and
Lord's Prayer,

are severally introduced.

2. Write out an account of the Lord's Supper in the words of the Catechism, comprising the several answers in a single consecutive passage.

3. "Because *they* promise *them both* by *their* sureties which promise when *they* come to age *themselves* are bound to perform."

Substitute the words meant for those printed in Italics.

Explain "sureties" and "come to age."

Section III.—1. Mention in what particulars the Morning and Evening Daily Services agree with, and differ from, each other.

2. Name the parts into which public worship is divided in the Exhortation at the beginning of the Daily Service; and prove that each part is agreeable to Holy Scripture by texts or instances.

3. Explain the words of the Catechism respecting *the duty of those who come to the Lord's Supper* by reference to *the several parts of the Communion Service.*

Section IV.—1. Enumerate the principal divisions of the Ecclesiastical Year.

From what parts of the Prayer Book do we learn them?

What spiritual objects does our Church propose to answer by adopting such a division?

What authority is to be found for it in Scripture?

2. Enumerate the special occasions for which our Church has provided separate services, and illustrate, by reference to Scripture, the propriety of doing so in each case.

3. Write out *one* of the three following articles, and prove from Holy Scripture the doctrine contained in it:—

XV. Of Christ alone without Sin,
IX. Of Original or Birth Sin,
XVI. Of Sin after Baptism.

SECTION V.—Give some account of the Church of England in one of the following periods:—

1. From the Norman Conquest to the death of Richard I.
2. From the reign of King John (inclusively) to the death of Henry VII.
3. From the reign of Henry VIII. (inclusively) to the death of William III., introducing, in the first of these periods, a more particular account of *Anselm* and *Thomas à Beckett;*

In the second, of *Pope Alexander III.;*

In the third, of *Wolsey*, *Cranmer*, *Laud.*

GRAMMAR AND HISTORY OF THE ENGLISH LANGUAGE.

SECTION I.—1. Define an active, a passive, a neuter, an auxiliary, an irregular, and a defective verb, with an example of each.

2. What are conjunctions? Explain their varieties, and show by examples their different uses in a sentence.

3. Explain the force of all the *moods* in a regular verb; show how they are formed; and point out in what way the present, past, and future tenses are expressed in each one of them separately.

SECTION II.—1. What is a pronoun? How many different kinds are there? Give examples of each.

2. Decline the following words:—Boy, Lady, Woman, Fish, Thou, Who, It.

3. What auxiliary verbs are used to express the following conditions of an action:—
1, Intensity; 2, Futurity; 3, Possibility; 4, Completeness; 5, Incompleteness; 6, Doubt; 7, Supposition; 8, Suffering?

Give examples of each by means of a sentence, in which the different conditions are embodied.

SECTION III.—1. Define a sentence. Give an example of sentences conveying an assertion, interrogation, command, wish. Show what change takes place in the order of the words in these cases.

2. What is a principal sentence, and what a subordinate? In the following passage underline the subordinate parts:—

> "but were I Brutus,
> And Brutus Antony, there were an Antony
> Would ruffle up your spirits, and put a tongue
> In every wound of Cæsar, that should move
> The stones of Rome to rise and mutiny."

3. Analyse the following sentence, and parse the words printed in italics:—

> "On *Erie's* banks, where *tigers* steal *along*,
> And the dread *Indian* chants a dismal song,
> There shall the *flocks* on thymy pastures *stray*,
> And *shepherds dance* at *summer's* opening *day*."

SECTION IV.—1. In how many different languages has Literature been cultivated in Great Britain? Give examples and dates.

2. Classify the Literature of England into four great eras, and mention some of the most distinctive productions in each.

3. Give a biographical sketch of one of the following writers, with some account of his works:—Chaucer, Shakespeare, Milton, Addison, Byron, and Wordsworth.

SECTION V.—1. Paraphrase one of the following passages:—

"Nature in men is often hidden, sometimes overcome, seldom extinguished. Force maketh nature more violent in the return; doctrine and discourse maketh nature less importune; but custom only doth alter and subdue nature. He that seeketh victory over his nature let him not set himself too great or too small tasks; for the first will make him dejected by often failures, and the second will make him a small proceeder, though by often prevailings. And at first let him practise with help, as swimmers do with bladders or rushes; but after a time let him practise with disadvantages, as dancers do with thick soles."

"Time hath, my Lord, a wallet at his back,
Wherein he puts alms for Oblivion
A great sized monster of Ingratitudes;
Those scraps are good deeds past; which are devoured
As fast as they are made; forgot as soon
As done. Perseverance, my dear Lord,
Keeps honour bright. To have done, is to hang
Quite out of fashion like a rusty mail
In monumental mockery. Take the instant way,
For honour travels in a straight so narrow,
Where one but goes abreast."

HISTORY.

SECTION I.—1. Name the chief Roman Generals in Britain, after Julius Cæsar; and give a short account of one of them.

2. State your reasons for believing that Christianity was introduced into Britain during the Roman epoch, and add dates where you are able.

3. Show from any traces which are now remaining, in names of places or things, the nature and character of the Roman dominion in Britain.

SECTION II.—1. Give a short description of Richard Cœur de Lion.

2. How did the character of John, and that of his son Henry III., effect the liberties of England?

3. Mention the cause, and describe the most important consequences, of the Crusades.

SECTION III.—1. State carefully what you have read about Lambert, Simnel, or Perkin Warbeck.

2. Contrast Henry VII. and Henry VIII., both in character and circumstances.

3. Give some account of the introduction into England, and early progress, of the art of Printing.

SECTION IV.—1. Show the difference between a limited Monarchy and a Democracy, and give instances.

2. Describe the composition of the Imperial Parliament of Great Britain, and explain the terms Adjournment, Prorogation, and Dissolution of Parliament.

3. When were Lord Lieutenants of Counties first appointed, and for what purpose? Show the difference between this office and that of High Sheriff, and, if you can, give instances from the History of England.

SECTION V.—1. What were the Olympian and Isthmian games? When and where celebrated?

2. What were "Gladiators?" Give an account of any one of them mentioned in Roman History.

3. Describe, as far as you are able, the private life of a Greek, like Alcibiades; or a Roman, like Mæcenas.

GEOGRAPHICAL AND POPULAR ASTRONOMY.

SECTION I.—1. Draw a map of the English coast from St. Bee's Head to the western point of Carnarvonshire, showing the counties, headlands, estuaries, bays, islands, and seaports in that part of England.

2. Show by a map the basin of the Trent, and explain the configuration of the part of England drained by it, and its affluents. Give the position of Burton, Birmingham, Coventry, Leicester, Nottingham, and Newark.

SECTION II.—1. Draw a map of the basin of the Rhine, and describe particularly the position of Constance and Basle.

2. What rivers flow into the Mediterranean, and what are its sea-ports?

3. What is the general direction of the slopes and counter-slopes of the continents of America and Europe? What influence do they have on the climates of these continents?

SECTION III.—1. What are the chief corn-growing regions of Europe?

2. Give the names and positions of places in Asia famous for battles in modern times

3. At Lisbon the average fall of rain is 27 inches, at Madrid 10 inches, and at Coimbra in the valley of the Mondego, under very nearly the same latitude, it is more than a hundred times greater. How are these facts explained by the physical features of the Peninsula?

SECTION IV.—1. What are the principal states in South America? Give the name and position of the capital of each state, also a concise account of the circumstances under which this part of the American continent was colonized from Europe, and became independent.

2. What is the physical character of the Atlantic Ocean? Does it possess any peculiar advantages for commerce?

3. Show by examples that the physical features of a country influence the characters and employments of the people.

SECTION V.—1. New York, Dublin, London, Brussels, Vienna, and Pekin, are said to have almost the same annual temperature, although they are not under the same parallels of latitude. Explain this fact.

2. Explain why a ship bound to the Cape of Good Hope, sometimes almost sights the coast near Rio Janeiro before she sails to the East; and why a ship bound to Hong Kong during the prevalence of the N.E. monsoon sails to the south of Australia.

3. According to what law do the winds veer in the two hemispheres? Show that the trade winds are only a particular case of this law.

SECTION VI.—1. Show by a diagram the meaning of the following terms: *Aphelion, Perihelion, Apogee, Lunar eccentricity, Longitude of Perihelion.*

2. Show how the latitude of a place may be found from the greatest and least altitudes of a circumpolar star above the horizon.

3. What is the right ascension of a star? How is it generally found?

ARITHMETIC.

SECTION I.—Work one of the following sums, and explain each step in the operation, so as to be intelligible to children:—

1. Divide 617652 by 309.
2. Multiply £13 17*s*. 6¾*d*. by 67.
3. How many pecks of corn at 44*s*. per qr. can be bought for 3*s*. 5¼*d*.?

SECTION II.—1. What is the value of a nugget of gold weighing 87 lbs., at £3 17*s*. 10½*d*. per oz.?

2. Find, by practice, the cost of 17 tons 11 cwt. 24 lbs. of coal, at 17*s*. 9*d*. per ton.

3. Divide 370 guineas among 17 men and 3 boys, and give each boy half a man's share.

SECTION III.—1. State and prove the rules for *pointing* in multiplication and division of decimal fractions.

Ex. Divide ·48 by ·000128.

2. A. B. and C. wish to go out to Australia, and for that purpose contribute respectively £$\frac{3}{8}$ $\frac{4}{9}$G. 5$\frac{5}{6}$*s*. per week towards a common fund. Find in how many weeks they will have amassed a sufficient sum to pay their travelling expenses, the charge for the three being £40 16*s*.

3. State the rule for the extraction of the square root.

Ex. $\sqrt{706681}$.

SECTION IV.—1. Find the interest of £750 17*s*. 6*d*. for 9 months, at 4 per cent. per annum, simple interest.

2. A person invests £10,000 in the 3 per cent. consols when at 95, find his annual income.

3. Find in what time £450 will double itself, at 3½ per cent. per annum, simple interest.

SECTION V.—Give and prove a short rule for one of the following questions in mental arithmetic:—

1. To find the price of a gross, the price of one being given.
2. To find the price of a cwt., the price of a lb. being given.
3. To find the amount per year, the price per day being given.

SECTION VI.—1. Explain fully the method of book-keeping by simple entry.

2. Describe the books used in book-keeping by double entry and their uses, and illustrate your description by examples from each.

MENSURATION.

Section I.—Define one of the following figures, and prove the rule for finding its solidity:—

1. A parallelopiped.

2. A pyramid.

3. A sphere.

Section II.—1. How many yards of carpet, 3 qrs. wide, will cover a room that measures 18 ft. 6 in. by 14 ft. 9 in.?

2. Describe one of the instruments used in surveying, and the manner of using it.

Draw a plan, and find the area of a four-sided field, from the following field-book—

	400 to A.
200	200
	From C. on R.
	300 to C.
	From B. on R.
	500 to B.
	From A.

EUCLID.

Section I.—1. Define a perpendicular, and show how to draw a line perpendicular to a given line from a given point in the same.

2. Define a triangle, and distinguish between the different kinds.

Prove that any two sides of a triangle are altogether greater than the third side.

3. Define a parallelogram, and show how to construct one equal to a given rectilinea figure.

Section II.—1. What is a rectangle? If a straight line be divided into any two parts, the rectangle contained by the whole line and one of the parts, is equal to the rectangle contained by the two parts, together with the square of the aforesaid part.

2. Divide a given straight line into two parts, so that the rectangle contained by the whole and one of the parts shall be equal to the square of the other part.

3. In acute-angled triangles, the square of the side subtending either of the acute angles, is less than the squares of the sides containing that angle, by twice the rectangle contained by either of these sides, and the straight line intercepted between the acute angle and the perpendicular let fall upon it from the opposite angle.

Section III.—1. Define a circle, and show how to find its centre.

2. Define a tangent, and show how to draw a tangent to a given circle from a given point without it.

3. If two straight lines cut one another within a circle, the rectangle contained by the segments of one of them, is equal to the rectangle contained by the segments of the other.

Section IV.—1. About a given circle describe a triangle equiangular to a given triangle.

2. Describe an isosceles triangle having each of the angles at the base double of the third angle.

3. When is the first of four magnitudes said to have to the second the same ratio which the third has to the fourth?

If four straight lines be proportionals, the rectangle contained by the extremes is equal to the rectangle contained by the means; and, conversely, if the rectangle contained by the extremes be equal to the rectangle contained by the means, the four straight lines are proportionals.

Section V.—1. Describe an isosceles triangle having each of its sides double of the base.

2. Describe a circle passing through three given points. Can this be done whatever be the position of the points?

3. If the triangle A B C, A B, A C, are bisected in the points D and E by th lines C D, B E, intersecting in F, then $D F = \frac{1}{2} F C$.

MISTRESSES.

HOLY SCRIPTURE.

SECTION I.—1. Enumerate the sins and chastisements of the Israelites during their journeyings in the Wilderness.

2. What moral warnings may be deduced from the history of Jacob?

3. To what extent, and in what manner, did the Law prepare the hearts of good men for the coming of Christ?

SECTION II.—1. Quote passages from the Psalms, showing the mercy and long-suffering of God, and give examples of both from the historical books.

2. Which Psalms speak most distinctly of the sovereign power of Christ? Quote the passages, with parallels from the New Testament.

3. Quote Proverbs referring to truthfulness, honesty, industry, and advantage of knowledge, and illustrate each Proverb by scriptural examples.

SETION III.—1. Quote passages showing the privilege and blessings of God's redeemed people.

2. Shew from prophecy that the Mosaic Covenant was to be superseded by a new dispensation.

3. Write out the substance of the application of Daniel on behalf of his people.

SECTION IV.—1. Explain the parable of the tares, or of the grain of mustard seed.

2. Explain the following texts, with a practical application:

> "It is impossible but that offences will come, but woe unto him through whom they come."
> "Thou shalt heap coals of fire on his head."
> "Make to yourselves friends of the mammon of unrighteousness."

3. Give an exact account of the events connected with the resurrection of our Lord.

SECTION V.—1. Give an account of the trial of St. Peter and St. John before the Council. (Acts iv.)

2. What events are associated with these places:—Lydda, Joppa, Paphos, Lystra, and Troas?

3. "If ye suffer for righteousness sake happy are ye." Illustrate this text from the writings and history of the Apostles.

LITURGY, CHURCH CATECHISM, AND CHURCH HISTORY.

SECTION 1.—1. Give in simple language a full meaning to each part of the reply in the church catechism which speaks of the promises made for us at our baptism by our godfathers and godmothers.

2. Write out the Nicene Creed.

3. Explain the terms "Keep God's holy will and commandments, and walk in the same," and name in the words of holy Scripture the different occasions upon which our blessed Saviour in the gospel refers to the tables of commandments.

SECTION II.—1. To which person of the Godhead is the principal part of the litany addressed? Give the reasons for your reply, and mention the difference which is generally made in prayer addressed to our blessed Saviour.

2. Explain generally, as you would to your oldest class, the scriptural character of the Prayer-Book, giving examples from its wording and order.

3. What is stated in the Book of Common Prayer to be required of all persons who are candidates for confirmation? Give a short abstract of the opening exhortation in the confirmation service.

SECTION III.—1. Write out the 6th article upon the sufficiency of Holy Scripture, and give scripture proofs for the first part of the same.

2. Give some account of the means by which increased opportunities for studying the Holy Scriptures have been afforded to the people of this country.

3. Mention in order the different translations of the Holy Scriptures into the English tongue, naming the persons engaged in the work, and the time at which each translation was accomplished.

SECTION IV.—1. Explain as in a gallery lesson, by the parable of the grain of mustard-seed, the extension of Christ's kingdom upon earth, as narrated in the Acts of the Apostles.

2. Give a short account of the Waldenses.

3. Mention some of the principal causes between the time of Richard II. and Henry VIII., which prepared the people of England for the Reformation.

ARITHMETIC.

SECTION I.—Write out the notes of an introductory lesson on

1. Notation.
2. Simple division.

Or, 3. Decimal fractions.

SECTION II.—1. If a person can count from 1 to 120 in a minute, how long will it take him to count two millions?

2. Write out the table of avoirdupois weight; and find the value of 23 cwt. 3 qrs. 16 lbs. at 6*d*. per lb.?

3. If a room is 16 feet long, 14 feet wide, and 10 feet high, find the cost of painting the walls at 1*s*. 7½*d*. per square yard.

SECTION III.—1. Find, in as many different ways as you can, the price of 179 articles, at 3*l*. 13*s*. 8*d*. each.

2. Make out a bill for 623 yards of muslin, at 2*s*. 9½d.; 85 yards of cambric, at 11*s*. 7*d*.; and 109 yards of linen, at 3*s*. 4½*d*.

3. If 21 lbs. of tea cost 6*l*. 16*s*. 10*d*., what will be the price of 35 lbs. of another kind, of which every 11 lbs. are equal in value to 9 lbs. of the first?

SECTION IV.—1. Find the interest on 120*l*. for 3 years 4 months, at the rate of 3½ per cent. per annum.

2. If 35*l*. maintain a family of six persons for 50 weeks, how long will 60*l*. provide for another family of eight such persons at the same rate?

3. In what time will 230*l*. increase to 250*l*. at 4½ per cent. per annum?

SECTION V.—Which is the greater, $\frac{7}{9}$ of 4½ or $\frac{4\frac{1}{2}}{\frac{7}{9}}$?

2. Multiply ⅝ of $\frac{4}{7}$ by 3¼, and subtract the product from 7.

3. Reduce 9*s*. 6*d*. to the decimal of 1*l*.; and 1*s*. 3¾*d*. to the decimal of a guinea.

SECTION VI.—Explain the use of the various books for keeping accounts, according to the system of—

1. Simple entry,
2. Double entry.

ENGLISH HISTORY AND BIOGRAPHICAL MEMOIRS.

SECTION I.—1. Who were the Druids? Mention the most remarkable features of their religious system.

2. State any particulars which you can remember of the invasion of Britain by Julius Cæsar.

3. Give an account of the state of this country under the Anglo-Saxons.

SECTION II.—1. Give the particulars of Wat Tyler's rebellion.

2. Describe, in as few words as you can, the characters of any two of the following persons:—Henry II.—Margaret of Anjou—Edward IV.—Henry VIII.—Mary, Consort of William III.

3. Mention the most remarkable instances in which English princes came into collision with those of Scotland, between the years 1135 and 1513.

SECTION III.—1. Give an account of the rise of Cardinal Wolsey, and of his death.

2. Place the following events in their proper chronological order, giving, when you can, the exact date:—The Conquest of Wales—The passing of the Habeas Corpus Act—The introduction of Printing into England—The taking of Gibraltar—The Hampton Court Conference—The colonization of New England.

3. In whose reign do we first find mention of the Puritans? Explain the origin of the party, and state what were their most characteristic opinions.

SECTION IV.—1. Describe the difference of dress in the times of King Alfred—Elizabeth—early part of George III., respectively.

2. Enumerate the principal articles of food at present purchased by the labouring population. Mention the countries in which they are severally grown or manufactured, the times at which each article was first introduced into this country, and any historical facts that you remember connected with its introduction.

3. Explain as you would to a class in a gallery, the words "Abbey" and "Monastery," comparing past and present times in respect of the institutions in question.

ON THE STUDY OF LATIN AND GERMAN.

> " Feeling that the *aggregated opinions* of the *influential inhabitants* of the town, as to the *merits* of the *different schemes* which have, of late, been *propounded* for the *municipal government* should be the *basis* of a *decision* on this *important question*, rather than the *opinions* of its newspaper *press*, we have, of late, and somewhat *reluctantly*, *abstained* from giving *expression* to our own thoughts on the *matter*. *Recent proceedings* in the town, however, have *induced* the *adoption* of a less *quiescent course*; and we now *submit* to our readers a few *considerations* on this now *absorbing subject*."

THIS is a fair sample of English as it is now written; and some people may consider it to be rather elegant. It contains many Latin words, and they sound well. But the sense is not as good as the sound; for if we inquire what is "the adoption of a less quiescent course," if we look to the sense of the words, we shall find it somewhat hard to get a clear notion of the writer's meaning. This is the kind of language that will serve for a newspaper, or a review, or a public address; but it is not the kind of language that produces any effect. When a man has read it, he is just as he was before; except that he may be slightly troubled by a certain humming or buzzing in his ears.

The English language has not a Latin foundation, like the French, and the Italian, and the Spanish. It has a Teutonic foundation, like the Dutch and the German. If a man will take a book of dialogues, one of the Manuals for Travellers, of which there are several, in English, German, French, and Italian, he will see the great difference between the English and the German on one side, and the French and the Italian on the other. But the English, which has often the same construction as the German, and sometimes the same words, has also a great number of words like the French and Italian, and unlike the German. A man who knows only English, will hardly see the different materials of which his language is composed; but to one who knows the Latin and the tongues derived from the Latin, the English has the appearance of a piece of patchwork. The German contains few words of Latin origin; it has grown to its present state with comparatively little mixture of foreign elements.

Some people who affect a great purity of language, and a plain Saxon style, as it is called, would avoid the use of words of Latin origin, whenever they can do without them; and so far they are right. If there is a Teutonic word, that is, a Saxon, or old English word, which will express our meaning, there is no reason for putting it aside for a more sounding Latin word. But we cannot get rid of all the Latin words; they are as much a part of our language as the other. The Saxon, or old English, was never cultivated so as to become what it might have become; and the reason is plain. All the learned, all who wrote at an early period of our history, knew Latin; and many wrote in Latin rather than in English. At the Reformation and the time that immediately followed, men began to write a good deal; but all or nearly all who wrote in those days had received a learned education, that is, they had learned Latin well. It does not appear that any of them formed their style on Saxon models, or old English models; the language and the writers that they were best acquainted with were the Latin, and accordingly from the time of the Reformation at least, it appears that the Latin language has had most influence on the growth of the English.

Our language has got something from the Norman French, something from the Italian and other languages, and something too from the modern French; but it is a fact that the language which we now speak and write has for more than two centuries owed more to the Latin than to any other;

and that the Teutonic elements which it contains have been neglected, while we have introduced Latin words, Latin compounds, and Latin constructions, often without propriety, and very often when we could have done without them. The translation of the Bible, the Book of Common Prayer, and Shakspere, show how much the Latin at that time had become incorporated with our English; and the sample at the head of these remarks will show in what state the language now is.

Within man's memory almost, we had a writer of great ability, a man of vigorous and independent thought, who unluckily knew no language well except Latin; and the sounding pomp of the Latin words suited his taste. Dr. Johnson certainly gave us a large stock of fine Latin words. How many new ones he made, or whether he made any new ones, I don't know; but he used his Latin very freely, and though most people admit that his style is too pompous, he has had a great effect on our national taste. Gibbon is another: he could never tell you plainly how anything happened; he wraps up what he has to say in so much finery, that a man hardly cares to take the trouble of seeing what is under the covering. William Cobbett, a man of our time, is a sample of the other kind. He knew nothing of Latin probably; or if he had learned any, it could not be much. He knew some French; perhaps he thought that he knew a good deal. However it did him no harm, for he wrote to the end of his days in the plainest, clearest, and most forcible way. Nothing could be better suited to his matter than his homely, but strong and vigorous manner of writing. He cannot be called a purist; he cannot be charged with affecting the use of old English words in preference to Latin. He took the words which his early education and his reading had supplied him with, and guided by his natural good sense he saw that he could make himself better understood that way than by attempting fine writing. I believe he is the last of our political writers who wrote with simplicity. At least if there are others who have now and then done something that is worth placing by the side of Cobbett's work, nobody has got a name like him; and it will be long before any man deserves it. These remarks, of course, apply to his style, to his manner; as for his matter, that was often bad enough, though it was not all bad; for many of his works have great merit, his "Rural Rides," for instance. His manner too was often coarse; but who could ever say that he was feeble or tiresome?

As the world now goes, we all write. So it was in Horace's time: all wrote, wise and foolish, old and young. Now when everybody writes, a language must be corrupted. The best writers in all ages have written at a time when writing was a rare thing. Some were better than others, and the best have been preserved, or some of the best. I do not speak of writers on what are called scientific subjects, for such do not appear in a nation's early history. I speak of poets, of historians, and the like; of those who have formed what is called the literature of a country. All the great writers that are still read, whether ancient, as they are called, or modern, have passed through a hard trial. Something like chance has preserved many who don't deserve it; and some of the best owe their present existence to the care of a few who had sense enough to value them; and posterity owes them thanks for their pains. It is the fashion with some people to decry everything that the present time produces; but this is very foolish; for all ages have their men who do good work. But the workers are now so many, that one who lives among them cannot always find out the good from the bad, and it will be the business of the next generation to select what is worth keeping. Present success is not a guarantee for future reputation; the future must and will be the judge.

But the fact is, good and bad are all working at a prodigious rate; writing about everything, in every possible manner. Most of these busy people have neither time to study nor to think: they have only just time enough to write. And how do most of them deal with the language? I say most; for we have good writers, but unluckily they are few. Most of them are not well acquainted with our old English writers, many of whom have some sterling stuff in them. To read the Bible is not very fashionable, and it would be useless to recommend it to those who are so busy with their own labours; but still it is true, that those who have read the English version with care will write the better for it. How many of those who write to amuse or to teach have studied any language with care after the time of attaining manhood? Now unless a man has a very unusual talent for writing, and some few have it, he must attain the power of writing well by long practice and much study. I say writing "well," for as to writing "much," Horace was right when he set little value on that. A good writer is like a good speaker: he is good, because he can teach, persuade, and please. Now a speaker is not good, simply because he is fluent, and can talk for an hour without stopping. Such men are generally stupid, senseless, impudent, and empty-brained; and the proof of their badness as speakers is that the utmost they can do is to tire those who listen. So with a writer. It is not merely a flowing style and fine words that will do. The young and the unthinking may be deceived for a time by such things; but in sober age they will want something better. Thus a boy is content with the froth of ginger beer; a man prefers a glass of good austere wine.

If a man would write well, he should have something to say that is worth hearing; but I know no way of helping him to that. He who feels that he has something in him and wishes to express it in the best way, should study our best English writers. But that is not enough: he should study the two languages which alone can now help him to improve and understand his own, the Latin and the German. The reason for studying the Latin is plain: it is the language which we are daily using, and from which we are daily drawing more, without knowing what it is that we do. We have innumerable Latin words in our language, some of which are used in a sense tolerably near the original, but others have very different meanings; and we may say of nearly all these words, that a man runs great risk of misusing them, if he does not know their use and meaning in the Latin language. It is probable that nearly all people who write have learned a little Latin badly in their youth: it is the foreign language with which they are most familiar, and they therefore use it most; but as they know little or nothing about it, they use it badly. It appears then to be sound advice, to tell those who would mend their style to study this language even now, even now while they are writing and teaching others; to humble themselves, if they can, to the belief that they have a great deal to learn and to unlearn. To those whose reading is confined, as one might elegantly express it, to the ephemeral productions of our periodical literature, to the charming fictions of the novel, and whatever else may help to amuse a vacant hour, I have nothing to say. Bishop Butler said right when he said, that no part of time "is spent with less thought than great part of that which is spent in reading." For those who read merely to pass the time anything is good enough; and it is immaterial whether they understand it or not. Those who read to improve themselves, who like to understand what they read, and get something for their pains, will find nothing so useful as a sound knowledge of the Latin language. By applying this knowledge to an examination of our modern writers, they will see with what false coin many of them pay their readers, who, instead of getting sterling value for their money, are put off with Brummagem ware.

The study of the German language seems to me also necessary to enable an Englishman to make the best use of his own; for he must study the other part as well as the Latin part. The study of the Anglo-Saxon, or old English, cannot help him here. Whatever may be its value for certain purposes, it cannot help us now to improve our language;[*] for it contains no literature that is suitable to the present day; and for that reason, among others, it cannot be made a common study. The German has grown out of rude materials, nearly the same as those of our old English, and, as already observed, it has suffered little under the influence of foreign tongues. The French, at one time, was doing it some mischief; but that danger is over. The value of a study of German to an Englishman is very great. This language and its literature give us access to all knowledge. In the present state of the world the circle of knowledge is wider than it formerly was: we want to know more than our fathers did, and we must know more. There is no branch of science or literature on which there is not something written in German; and often something good. He who knows German well, possesses the key to more knowledge than any other language can give him, or than all the other languages in the world could give him, if he knew them and did not know German. An educated German knows that he should know English; for a knowledge of our language and habits helps to make him a complete man. In England and the English he sees the practical life, in which Germany is deficient. So an Englishman whose ideas are most practical, but often narrow and incomplete, will find his mind enlarged by an acquaintance with the language and literature of Germany.

I think that a careful study of the German language would do a great deal towards keeping our own language in a tolerably good condition. He who studies German is driven to compare it with English: he cannot avoid looking into the etymological forms of the two languages, tracing meanings of words to their original, and thus fixing a more exact value to them. The German construction also will often make him understand that of his own language better, both when it agrees with the English and when it differs: for the observation both of sameness and difference instructs us. It is perhaps rather a fortunate thing that German is not learned easily; at least, to learn it well is a laborious thing. The study of the German may be made, as a discipline, a very good substitute for one of the learned languages; and as there are now many schools in which boys who learn Latin do not learn Greek, the best thing that can be done is to put German in the place of Greek, and to make the boys learn it well.

How German is to be taught well is another question. Generally it is not taught well: but it can be learned in a reasonable time, if a good method is followed. If a diligent boy of the age of fourteen or fifteen is taught well for a couple of years, he will learn the language, and without neglecting his other studies. If he learns Latin well and German well, and has to write an address or anything else, he will not write in the style of the heading of this paper. And this remark brings me to the conclusion, that those who write in that way know neither Latin, nor German, nor English, nor anything else; and also to the conclusion, that no part of time is spent with less thought than a great part of that which is spent in writing.

G. L.

ON THE STUDY OF WORDS.

THE appearance of Mr. Trench's little work under this title* awakened our attention to a subject, with which we have been long familiar, and which we were glad to see presented to the public in so attractive a form. Mr. Trench has drawn from the unarranged mass of the English dictionary (we mean unarranged in relation to the object he had in view) such words as would best avail for the instruction he intended to communicate, and has disposed them under different heads to form the subjects of his diffrent Lectures.

That this book has already reached a fourth edition is no slight proof of public estimation; and it really appears to us that its merits are of so preeminent a character as to deserve a very first place among those which treat of the more valuable principles of philology. We have already *referred* to it more than once. It is not a dry discussion on affinities and etymologies, to which so many able pens are at present profitably, though perhaps too exclusively, directed; but, resting itself in the main on known and acknowledged origins and meanings, it proceeds to display with force and vivacity—what we have in our minds ventured to distinguish as the moral virtues of the English language.

The Lectures were originally intended to be addressed to the pupils of the Diocesan Training School at Winchester, and to them only; but additions were made for other hearers—some, we presume, of more finished education—and have ultimately been adapted for the public at large. But their first destination is well deserving of serious reflection: it was for the edification of those, who were to be shortly "schoolmasters abroad," employed in the education of those classes, to whom education has hitherto in this country been a thing almost unknown; and if they enter into the performance of their appointed duties with understandings duly trained for the reception of a TEACHING so enlarged and enlightened as these Lectures of Mr. Trench were in their first outline designed to present to them, we may look for an improvement in the moral and mental condition of that portion of society, which is to enjoy the benefit of their services, far exceeding anything that our fathers ever hoped for or anticipated. But the improvement thus promised is not wanted among this portion alone; it must mount upwards, and be accepted there. Indeed we have heard that a renowned professor at one of our Universities has already earnestly recommended this little book to his own pupils, claiming their thanks for thus enabling them to make so valuable an addition to their customary routine of study. It may indeed be truly said to extend the outline of those studies; presenting words in aspects, sometimes of considerable novelty, and at all times worthy of much more than a passing thought; and it is because we have this opinion of its useful character, and because in particular instances we have a desire to give utterance to certain notions of our own, that we shall not confine this notice to our accustomed limits in ordinary cases.

Before we proceed to the body of the work, we must dwell a moment on its preface, where we were pleased to meet with a name well known to us in early days, and never to be discarded from our grateful remembrance; and to which we are desirous to join with Mr. Trench in paying a tribute of respect. "Whatever," says our author, "may be HORNE TOOKE'S shortcomings, whether in the occasional details of etymology, or in the philosophy of grammar, or in matters more serious still, yet with all this, what an epoch in many a student's intellectual life has been his first acquaintance with The Diversions of Purley."* We can ourselves sincerely vouch for the truth of this assertion, and as more modern philologers have rather too much diverted the student in language from this great master, we think we shall be doing a service, if we endeavour to revive the fame of that, in its own department, unrivalled production, by impressing the sanction of a most accomplished judge to confirm our own unison in the opinion—the more reserved opinion—of Mr. Trench.

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* On the Study of Words. Lectures addressed (originally) to the Pupils at the Diocesan Training School, Winchester. By the Rev. Richard Chenevix Trench, B.D., &c. &c. &c.

"It is" (says Lord Brougham) "as a philosophical grammarian that his (Horne Tooke's) name will reach distant ages. Acumen not to be surpassed, learning quite adequate to the occasion, a strong predilection for the pursuit, qualified him to take the first place, and leave the science, scanty when his inquiries began, enlarged and enriched by his discoveries—for discoveries he made as incontestably as ever did the follower of physical science by the cognate methods of inductive investigation. He has made one of the driest subjects in the whole range of literature or science one of the most amusing and lively of books, nor did any one ever take up the 'Diversions of Purley' (as he has quaintly chosen to call it) and lay it down till some other avocation tore it from his hands." [We can well recollect,—though it was not in this century, that the *epoch* (to use the expression of Mr. Trench) occurred—that such with us was literally the case.] "The success" (continues the noble philosophical critic) "of his system has been such as its great essential merits, and its more superficial attractions combined might have led us to expect. All men are convinced of its truth, and as everything which had been done before was superseded by it, so nothing has been effected since, unless in pursuing its views and building upon its solid foundations."†

Lord Brougham, it will be observed, does not speak of the *shortcomings* to which Mr. Trench alludes. And we should rejoice exceedingly to see from the hand of Mr. Trench a careful examination into what he considers to be their nature, causes, and effects, so far as the philosophy of grammar is concerned,—no further. Who so well qualified? Or if the whole of the subject would be unwelcome to him, let us exhort him to extend the range of his excursions into "The Study of Words," and as an appendage to his elucidations of the moral virtues of our tongue, instruct us in those of its mental or metaphysical. We do not say,—with the sarcastic‡ philosopher of Wimbledon for his guide, but assuredly as a companion; and that as such he would be willingly accepted there are some incidental intimations dropped in the pages of this little book. Those who have had the good fortune to read the second volume of the Diversions of Purley will recollect the startling assertion that "to *think*" is "to be *thinged*"—that "me thinketh" is no other than "*me thingeth*, or *it thingeth* me;" that, in like manner, the Latin "*res*, a thing, gives us *re-or*, *I am thinged*."[*] We cannot help suspecting that this doctrine—to many a neoteric heresy—has left no unfavourable impression on the mind of Mr. Trench; that it has mint-*ed* itself there; for, in his fourth Lecture, we find this pertinent remark, parenthetically introduced;—and which instantly recalled our own impression;—(at the moment,

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* This, we regret to say, is the only tribute to "The Diversions of Purley." There is no acknowledgment of obligations, great as they are. (See Lect. 6, p. 185, et seq.) Because "multiplied references, from the popular character of these Lectures, would have been plainly out of place," it was the more becoming that at the very outset one general acknowledgment should have been distinctly made.

† Statesmen of the Time of George the Third, pp. 114, 116.

‡ Many of our readers may recollect Lord Brougham's *reception* in the House of Lords as a peer of the realm. One Noble Lord would not be *sarcastic*. Lord Brougham assured him he was not—he could not be; and explained the word, something after the manner of Mr. Trench, who tells us "that a 'sarcasm' is properly such a lash inflicted by the tongue as brings away the *flesh* after it," p. 197.

> "Dead in obscure oblivion, as the thing
> That never was;")

"By '*things*' I mean subjects as well as objects of *thought*, whatever one can *think* about."[†] We may be mistaken, but at any rate we are glad to seize the opportunity thus casually afforded, of producing this especial etymology of Horne Tooke's, so intimately connected with the philosophy of grammar and of "the human understanding," as above all others worthy of distinction in the further prosecution of the study of words.

To proceed,—"a language (say the authors of the "Guesses at Truth") will be often wiser, not merely than the vulgar, but even than the wisest of those who speak it." And it is to the detection, and to a full and glowing exposition, of this latent truth, that the labours of Mr. Trench are directed; with what success it is now our immediate purpose to give our readers the power of judging for themselves.

The first Lecture is very properly directed to excite in his hearers, or, we should now rather say, readers, an interest in his subject, to convince them of its usefulness, and persuade them that it is neither dull nor uninteresting; and he produces several striking instances to illustrate and establish this indispensable preliminary.

But we proceed at once to his Second Lecture, entitled, "On the Morality of Words;" and the first unfortunate combination of syllables on which Mr. Trench, true to his vocation as a minister of religion, insists, is one, imported it is true from pagan Rome, the Latin *malevolentia*,[‡] bearing melancholy evidence of the immoral tendencies of man, of his degraded propensity to desire the calamities of man; to indulge a feeling of evil-willing to his fellow, and rejoice in the ill that befals him. Of this strange perversion of affections due to his kind, and strongly implanted in his heart, there is no language that does not bear mournful record. It may, however, be adduced in mitigating behalf of poor human nature, that as there are sons of Cain to harbour this odious feeling, so there are sons of Adam to brand it on their foreheads with an odious name.

Continuing in the same downward course, there are many words not only innocent but honourable in their first significance, which have been degraded from that significance to gratify the passion for humbling and debasing those, on whom we may wish to affix a mark of distinction, that shall remove them afar from the position we usurp to ourselves. One of the most remarkable of these is one of home growth, which in some sense or other is likely to preserve an imperishable existence wherever the

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[*] Quoted by Mr. Trench, Pref., p. v.

[†] Lect. 4, p. 111.

[‡] Which Cicero, Tusc. Quæst. L. 4, c. 9, interprets, "Voluptas ex malo alterius (sine emolumento suo)." The Gr. 'Επι-χαιρε-κακία expresses the whole in a word.

English tongue is spoken; it is TIME-SERVER, and as our author barely refers to the book in which he finds the good *time-server* described in all his original glory, we will transcribe the passage at large, as we think it will contribute to amuse as well as to instruct our readers.

"Maxim 1.—He is a good *time-server* that complyes his manners to the several ages of this life; pleasant in youth, without wantonness; grave in old age, without frowardnesse. 2. He is a good *time-server* that finds out the fittest opportunity for every action. 3. He is a good *time-server* that improves the present for God's glory, and his own salvation. 4. He is a good *time-server* that is pliant to the times in matters of mere indifferency. 5. He is a good *time-server* that in time of persecution neither betrays God's cause nor his own safety." [*]

We firmly believe that this country may pride itself on possessing many public men, on whom the name of the good *time-server* may be deservedly bestowed, while there are others who persuade themselves of success in struggling to compel the time to serve them[†].

Language, however, is happily not destitute of the power of presenting to us more cheering aspects of our tendencies, by purifying some words from their grossness, and elevating others from their humility; and of this latter process, this very word *humility* is a noted instance, which, from the Greek and Roman abasement,—to lowliness, abjectness,—was raised by the Christian fathers to the dignity of a Christian grace.

There is now a word before us which demands a pause—KIN, KIND. Our old writers bear ample evidence that *kind* meant "native or natural, suited or adapted to the nature or *kind*, the *kin*," and that *unkind* denoted just the reverse. "And beautiful before," (exclaims our animated divine,) "how much more beautiful now do the words 'kind' and 'kindness' appear when we apprehend the root out of which they grow; that they are an acknowledgment of loving deeds of our *kin*-ship with our brethren; and how profitable to keep in mind, that a lively recognition of the bonds of blood, whether of closer ones which unite us to that, whom by best right we call our family, or those wider ones which knit us to the whole human family; that this is the true source out of which all genuine love and affection must spring; for so much is affirmed in our daily, hourly use of the word," p. 42.[‡]

"No slight conjectures" (says Bacon), "but such as were well worth the observation, might be taken (which a man perchance would little think), touching the natural dispositions and customs of people and nations, even from their languages. Surely a man may collect that the Grecians were more fit to study arts, the Romans to manage affairs of state; for distinctions of arts, for the most part, require composition of words, but matters of business simple words." Pursuing the same train of reflection, Mr. Trench well remarks, that "to study a people's language will be to study them." We shall learn, among other matters, the tone of feeling, which prevailed in various relations of social intercourse, far different from that which we may discover to exist in other nations. Thus the Greek predominant passion for public life and public distinction, and the slight on those who walked in the lowly path of a private station, are marked in the gradual decline of the word "idiot," from its original signification, a private person, to the rude and unlearned,—boor; because with wits unexercised where alone they could be exercised, in the business of public life; and then to one without possession of faculties to exercise, to one born deficient, destitute of intellectual faculties.*

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[*] 1 Fuller's Holy State, b. 3, c. 19.

[†] Our old Church historian, however, further tells us of two kinds of *time-serving*, that are damnable. These we at present take the liberty (Scotticè) to *ignore*.

[‡] It is well worthy of remark that *human* and *humane*, *humanly* and *humanely*, are *now* so written to distinguish their application. *Human* is the modern writing. *Inhumane*, the old form, has fallen into disuse.

The cheerful temperament also of the Greek is manifested in their common salutation, Rejoice! while the deeper longings of the Hebrew find their utterance in "*Peace!*" The all-absorbing devotion of the Italians to the arts shines conspicuously in the degradation of the "virtuous" to a *virtuoso*, and of Cicero to the office of a *Cicerone*.

Our readers must understand that we are endeavouring to give them an antepast, provocative of appetite for the entertainment of perusing the Lectures themselves, and of pursuing those inquiries, to which it is the object of these lectures to direct the way.

The third Lecture is on the history of words, where, Mr. Trench observes, we shall frequently find garnered "stores of historic lore." How for instance is the Anglo-Saxon *Cyric*, the English "Church," from the Greek, to be explained? how is its introduction to be accounted for, especially as our ancestors "were *almost* universally converted through contact with the Latin Church, in the western provinces of the Roman empire, or by its missionaries?" It is thus: history records that "*before this* (about A.D. 250), some of the Goths on the Danube had been brought to the knowledge of Christ by the Greek missionaries from Constantinople; and this word κυριακη, or *Church*, did, *with certain others*, pass over from the Greek to the Gothic tongue, and these Goths, the first converted to the Christian faith, the first therefore that had a Christian vocabulary, lent the word in their turn to other German tribes, among others to our Anglo-Saxon forefathers; thus it has come round by the Goths from Constantinople to us," pp. 67, 68.

We accept this historical translation; it removes the difficulty under which those learned North-men, Wachter and Ihre, laboured. They admitted the fact, but they could not account for it, especially as they had a word of their own, "Horgh or Haurg," which Wachter thought varied little from *Kirch*, and might have given rise to it. But there is another word;—one, as we are inclined to suspect, "of those certain other words" alluded to by Mr. Trench, to which the same historical translation has not been accorded, though perhaps equally entitled, and that is the word "Heathen."

The history of *Pagan*, a villager, from the Latin Pagus, a village, which the popular page of Gibbon has made so extensively known, is triumphantly adduced by Mr. Trench to show that "The Christian church fixed herself first in the seats and centres of intelligence, in the towns and cities of the Roman empire; and in them its first triumphs were won; while long after these had accepted the truth, heathen superstitions and idolatries languished and lingered on in obscure hamlets and villages of the country, so that "Pagans," or villagers, came to be applied to all the remaining votaries of the old and decaying superstitions, inasmuch as far the greater number were of this class.† The word *Heathen*" (Mr. Trench continues) "acquired its meaning from exactly the same fact, namely, that at the introduction of Christianity into Germany the *wild* dwellers on the *heath* longest resisted the truth" (p. 69).

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* In 1 Cor. 14, vers. 16, 23, 24, Gr. Ιδιωτης; Lat. Vulg., *Idiota;* Wiclif, *Idyot;* Common Version, *Unlearned.* Mr. Trench says, *Idiot* in its primary use is occasionally employed in English; and cites Bp. Taylor.

† It is not till the middle of the fourth century that *Paganus*, so applied, is found in any written document: an edict of Valentinian, A.D. 367.

It is as to the correctness of this etymology that our old etymologers are at variance: it is approved by Vossius and Kilian: the Latin *Ethnicus* by Wachter; and the Gr. *εθνη* by Junius, which is unhesitatingly adopted by our own Bentley. Ihre doubts, and we cannot deny that he has plausible reason for doing so; and we will state our own reasons for concurring in his doubt.

In addition to the native villagers, whose own old name was degraded to a name of compassion or contempt, we learn from history that when the profane worship of the Ethnic or Heathen or Gentile Gods was proscribed from towns and cities by Constantine and his sons, the idolaters took refuge among those *pagans*, and, as refractory "miscreants, or miscredents," gave greater emphasis to the distinctive appellation. Now, the derivation of *Heathen* from *Heath* presumes and implies that Christianity had been making a similar progress in northern towns and cities among the Germanic tribes; and that there remained dwelling on the *heaths* a populace of idolaters, on whom the title of *Heathen* was imposed for the same purposes of distinction. Does history bear any record that such was the case? or is it not, that this undisputed origin of Pagan from the place of his abode tempts the northern etymologer to surmise and appropriate a kindred origin for "Heathen?"

Why, we may further ask, may not the Gr. 'Eθνη have been one of those *certain other words* introduced among the German tribes, through the Goths on the Danube, those *prior* converts? or, is it not still more probable that, as it was "through the Latin Church that these tribes were almost universally converted," the Latin *Ethnicus*, which Tertullian freely employs, was transformed at once by the Fathers of the Latin Church into the Gothic *Haithn*, and Anglo-Saxon *Hæthene?*[*]

May it not, on the whole, be fairly concluded that the Greek Christians, engaged in the office of conversion—that the Latin Christians, devoted to the same errand of good tidings, carrying with them a name long applied by them to all Gentiles, Ethnæan, or Heathen peoples, planted it in every land on which they established the banner of the cross, and that there it was welcomed and adopted, and, in course of time, was imposed as a title of distinction by the converts of the cities or towns or hamlets on the dwellers on *heaths* or elsewhere, to whom the labours of conversion had not reached, or with whom they had not been successful?

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[*] We find these words in the Goth. and Anglo-Saxon Versions of the Gospels—from the Gr. 'Eθνικος, 'Eλληνις; in the Lat. Vulgate, Gentilis, Ethnicus.

AGRICULTURAL SCHOOLS IN IRELAND.

In a former Number (p. 129) we noticed some of the beneficial effects already produced in Ireland by the agricultural schools, which are gradually spreading through various parts of that country under the superintendence of the Commissioners of National Education. We showed that hitherto industrial training has not been found to interfere with the literary instruction of the pupils, but rather to promote their progress in it: and that agricultural instruction has led them to manifest a desire to learn practically the improved systems of agriculture, and to form more accurate habits of observation. We also alluded to the gratifying fact, that an improvement has already appeared in the agriculture of the neighbourhood of the agricultural schools, in consequence of the examples of better cultivation on the model farms attached to the schools, to which the pupils have drawn the attention of their parents, and in many instances persuaded them to adopt the improved system of their instructors. And we mentioned, as a proof of the merit and success of these schools, that their reputation has extended beyond Ireland, and that even Scotland has sought for information respecting the Irish system of agricultural instruction, with the view of adopting it. We believe that the adoption of such a system would be as beneficial to England as to either Scotland or Ireland, and in the hope of promoting this object we are induced to make some further extracts from the last (the eighteenth) Report of the Irish Commissioners.

One most essential step towards the establishment of agricultural schools is to provide teachers who combine manual skill and dexterity in the use of implements with a knowledge of the improved systems of husbandry and of the principles and sciences connected with agriculture, and who also possess the faculty of imparting what they know both in theory and practice. To find instructors thus qualified is at present the chief difficulty. It can only be effectually overcome by forming a class of persons of this description under a course of regular training. The establishment of institutions for such a purpose is therefore one of the first objects to be attended to. With a special view to this end the Irish Commissioners have already, in addition to 37 ordinary agricultural schools, established 28 model ones. And in order to promote their more general adoption, and to encourage parents to send their children to them, by making their nature and objects more extensively known, the Commissioners have published for circulation the following document.

"PROSPECTUS OF THE MODEL AGRICULTURAL NATIONAL SCHOOLS.

"The object of these Institutions is, besides affording Agricultural Instruction to the more advanced pupils attending the Literary Schools, and setting an example of skilful cultivation to the farmers in their neighbourhood, to educate and train a class of young men destined for agricultural professions as Agricultural Teachers, Agriculturists, and Land Stewards. With this view accommodation has been provided at each for a certain number of resident Agricultural Pupils, or "Boarders," of whom one is always to be a *free* pupil selected from the most deserving pupils of the School, the others being required to pay *half* the estimated cost of their maintenance.

"The persons selected to fill these Agricultural Scholarships must be not less than FIFTEEN years of age, of good moral character, sound physical constitution, and fair literary acquirements. Pupils of National Schools will obtain a preference.

"They will be dieted, lodged, and will have their washing done in the establishment; and will receive literary instruction from the Schoolmaster, and a course of lectures on Agricultural Science from the Agriculturist, besides practical instruction on the Model Farm, in all the operations of which they will be required to assist.

"The course of instruction will comprise :—

"In the Literary Department—Reading; Writing; Grammar, including English Composition; Geography; History; and Arithmetic, Book-keeping, and Geometry, especially in their relation to Agriculture.

"In the Agricultural Department—Drainage; tillage by manual and horse labour, with the description and use of the different implements necessary; rotation of crops; preparation of the soil, for time and mode of sowing, after-culture, harvesting and economizing the different crops cultivated; the best modes of collecting and preserving manures, with the nature and utility of stimulants and special manures, the crops to which they should be applied, at what time, and in what quantity; the breeding, rearing, house-feeding, and general management of the different kinds of live stock.

"While inmates of the Establishment, they will be required to conform to its rules, and they will be constantly under the charge of a vigilant and intelligent Superintendent, who will strictly enforce order and discipline, and enjoin the observance of all moral and religious duties.

"When the course of study in these Establishments is completed, those who have distinguished themselves by their good conduct and proficiency will have an opportunity of being sent to the principal Establishment at Glasnevin, there to complete their course of training free of any further expense.

"In order to place the opportunity of receiving such useful and valuable instruction within the reach of the humble class for whom it is chiefly designed, the Commissioners have determined on fixing the amount to be allowed for the maintenance of the Agricultural Boarders at the minimum sum that would be adequate to meet the expense of it according to a plain, but substantial scale, which is estimated at £12 per annum.

"The amount to be charged to each Pupil is £6 per annum, payable quarterly in advance.

"RESIDENT AGRICULTURAL PUPILS' TIME-TABLE.

	H. M. H. M.	
"At	5 0 A.M.	Rise.
From	5 0 to 5 30	Dress and make up Beds.
„	5 30 to 5 45	Prayers.
„	5 45 to 6 30	Feed and Clean Stock, Clean Yard, &c.
„	6 30 to 7 0	Wash and prepare for Study.
„	7 0 to 8 45	Study Agricultural subjects and attend the Lecture or Examination of the Agriculturist.
„	8 45 to 9 0	Prepare for Breakfast.
„	9 0 to 9 30	Breakfast.
„	9 30 to 2 0 P.M.	Feed Stock and Work on the Farm.
„	2 0 to 3 0	Dinner.
„	3 0 to 6 0	Feed Stock and Work on the Farm.
„	6 0 to 6 30	Prepare for Study.
„	6 30 to 8 0	Study Literary subjects under the superintendence of the Literary Teacher.
„	8 0 to 8 30	Supper.
„	8 30 to 9 15	Feed Stock and arrange every thing for the night.
„	9 15 to 9 30	Prayers.
At	9 30 to . .	Prepare for Bed.
At	9 45 . . .	Extinguish lights in Dormitory.

"The above is designed for the *Summer* half year; during the Winter months the hours for rising, meals, labour, and instruction must be regulated according to the season."

It is stated in the Report, that during the preceding year twenty-seven agricultural boarders from the different model agricultural schools had been admitted into the principal establishment at Glasnevin, in the vicinity of Dublin, there to complete their course of training free of any further expense, as described in the Prospectus. An increasing desire is observable, on the part of farmers and others, to have their sons admitted as agricultural boarders, and it is found that those whose sons have been thus educated are fully sensible of the advantages they have derived from the valuable instruction and industrial training they have received; and the conduct of the young men, and their attention to their studies, have in general been most satisfactory. The inspector of agricultural schools bears testimony to the conduct and efficiency of their teachers as generally most exemplary, and states that he is enabled to speak thus favourably, not only from his own experience acquired at different visits, but from accounts received from proprietors, and others who feel an interest in and have closely watched their proceedings. They do not confine their labours to the superintendence of their schools and farms, but not unfrequently discharge the duties of "practical instructors" in their respective localities, and many of them are beginning to direct their attention to experiments in matters of practical importance to the farmer, such as on the value of peat charcoal as a manure, alone and in conjunction with other manures, and the comparative effects of different kinds and quantities of manure on the turnip crop.

The circumstance that a class of persons qualified to act as agricultural teachers must be trained, and, as it were, created, before agricultural schools can be extensively established, may of itself suffice to show that it must not be expected that the beneficial results of such a system will be immediate and speedily general. Education sows the seed, of which improvement will in due time be the fruit. And it is truly remarked, with reference to this subject, that as in ordinary cultivation some crops take only a short time to arrive at maturity, while others require a long period to attain perfection, so from the cultivation of the minds of our young farmers and labourers many beneficial results are *already* observable; but the general harvest of improvement will be slow in coming round. Meanwhile, however, it is most encouraging to perceive that the fruits which have already appeared are of a nature to grow with the growth and to multiply with the spread and progress of the system itself. We trust we may regard it as a happy omen for the future, that Ireland has taken the lead in establishing such a system of thorough and effectual agricultural education in connexion with the ordinary national and parish schools. The agriculturists of Scotland have confessed, that although they could hardly have a better educated class, as regards general knowledge, than the agricultural classes of that country, yet they have hitherto had no means of supplying them with that *professional* education which the present state of agriculture, and the rapid advances now making in it, have rendered necessary. They appear to have been guided by the experience of Ireland to the conclusion, that the parish schools of Scotland afford the means of carrying on this branch of education to a considerable extent.

We may reckon, as next in importance to the model agricultural schools, those workhouse schools which have agricultural departments in connexion with the system of national education. As to the working of these schools, the first particular worthy of notice is, that each year shows an increased demand for the workhouse boys by the farmers, so that the age at which the boy now leaves the workhouse becomes a very early one, and averages that of ten years. Each year, also, says the Report, shows increased good behaviour on the part of the boys, who may perhaps be termed apprentices. "Every year's experience," writes the agricultural inspector, "convinces me more forcibly of the necessity of industrial training for pauper children, and I am happy to find that this opinion is steadily gaining ground both here and in the sister country." Having alluded to facts which he has himself stated as bearing him out in this assertion with respect to Ireland, he proceeds to give extracts from a parliamentary document, in order to show the progress of such a system of industrial training for pauper children in England. Some of these extracts have so direct a bearing upon the object which we have in view in drawing the attention of our readers to the system of agricultural instruction in Ireland, that we shall venture to quote one of them, though it be, as it were, at second-hand, from his Report.

It is copied from a letter from the clerk of the Atcham Union in the neighbourhood of Shrewsbury, in which he gives the following account of the origin and establishment of an industrial school in the Union-house, and of the principles and practice maintained in it during the fourteen years of its operation:—

"At first the number of children was small, the guardians feeling it desirable not to crowd their workhouse until time had afforded all parties concerned in its government a little practical experience therein. A school was at once established, but as no qualified schoolmaster applied in answer to an advertisement for such an officer, the situation was taken by a person, who, though deficient in mental acquirements for such an office, was a practical agriculturist, of good moral character, and who entered on his duties with a determination to do all that he could for the welfare of the children put under his care. The first step was that of making the school a place of moral as well as physical training, to which I attribute its great success. For this purpose everything that transpired was, to the extent of his ability, made the subject of some practical and familiar observations, enforced by such illustrations as became weighty by example. Industry was from the first a marked characteristic of the school, to inculcate which various in-door occupations were and still are practised, such as knitting, netting, platting straw, &c., by which means it became a natural habit in the children to be doing something that was useful, so that, when fatigued with heavier toils, the child sat down to rest, it was, I had almost said, an instinctive feeling that led him to take his straws or needles in hand, and yet the gratification afforded when he found he had enough plat for a hat, and the pleasure evinced when by himself or his companions it was so formed, proved that his mind had received a correct bias as to the production by his own application, nor was there ever occasion to enforce this practice when once begun, as it became a source of pleasure to be so engaged; but whenever we found a lazy boy it became the subject of a moral lecture, and as work was and still is held to be its own reward in our school, if a boy is found idle the punishment is simple:—take him away from his work to look at the others busily employed; and so severe is this in almost every case, that I have scarcely ever known a boy remain half an hour without petitioning for liberty to go to work, and I have been equally pleased to see that others, instead of making any taunting remarks, have become petitioners on behalf of their schoolfellow.

"These may appear trifling incidents; but let guardians and officers try the plan, and watch the issue in future service, and they will find, as I have done, that they are important facts; and I notice them because for the want of seeing this important fact at the outset, that the child is to be trained to the principle of being useful, so much of the other efforts are vain. Another important point we have always aimed at has been to teach the child to do his work well, to do that work in the right way, and then to make him understand why that particular way is best, and this gives them additional interest in their work, while it tends to make them good workmen in after life. Our chief mode of employment is on the land we cultivate by spade husbandry, a portion of which has, from the opening of the school, been cultivated exclusively by the boys.

"The quantity has varied with our numbers, and is at present a little more than two acres of clear ground. So long as potatoes formed the only vegetable used in our dietary, we had little opportunity of cultivating to advantage, for want of a market; in this particular we are now in a better situation as to cultivation, while the variety of vegetable matter used for food in the house appears to have been of benefit to the general health of the inmates of the house. With eighteen or twenty boys above nine years of age, and not exceeding fourteen years, no workhouse should have less than from two to three acres of land for school cultivation, and it is highly important that it be kept exclusively for that purpose, no adult pauper being allowed to enter thereon. On this land the boys may be made practically useful, and by the use of the liquid manure produced in the house, deodorized with sulphate of iron, it may be made profitable.

"In addition to our land, we have now some pigs, which I have always strongly recommended as a valuable adjunct to the school garden, and regretted that I could not until this year obtain the consent of the board to keep them. I bought two for them about six months ago; they have had nothing but the house wash and the garden refuse, and I should be very willing to give the board 5*l.* over their cost price for them now. I have just bought five more young ones, and would strongly urge other unions to keep pigs, to be attended to by the children under the direction of the master. I know that some persons strongly advocate a nearer approach to farming, by the extension of land, the keeping of cows, &c.; but of these I have had no experience here. I have, however, seen it tried, and in every instance it has failed; and although it may succeed for a

> time, I am of opinion that it must ultimately be attended with serious evils if attempted in a workhouse school.
>
> "Having stated the nature and practice of our school for fourteen years, it only remains to speak of its success. It has been said that the tendency of workhouse schools is to make perpetual paupers, and such statements are made, no doubt, in the full belief of their truth; but I am happy to say that, so far as fourteen years may serve for the data of calculation, it is without a shadow of foundation here. Our children go to service, and I would rather refer inquirers to their employers for their characters as servants, than speak of it myself. Suffice it to say that, with a very few exceptions (and those of characters the most vicious and thoroughly formed before they came to us), and one or two cases of serious illness, they have not returned, except, as is frequently the case, to visit the school where they were trained in the habits of virtue and industry, and leave behind them some trifle, either in money or otherwise, to the school fund. If we trained them up as paupers, I think many of them bid fair to forget the place of their training before they return. Scarcely a child who has been taught in our school leaves it without those feelings of affection for their associates which indicate most clearly that the mind has been cultivated, and the assistance they afford in procuring situations for those they left behind proves the genuine character of their attachments; but to return to the workhouse after going to service is felt to be a disgrace, and will, I hope, as it has hitherto done, prevent such a circumstance ever occurring except in cases that are unavoidable; and in such cases I hope that a sense of rectitude and the love of virtue will seek such an asylum in preference to crime."

This account is deserving of peculiar notice, as it is given by a gentleman who has had a great deal of experience in every branch of poor-law administration, and who has paid very considerable attention to the subject of workhouse schools during the past sixteen years. The school of which he relates the gradual promotion must have been among the very first of an industrial nature in connexion with a workhouse under the new poor law. And it is very remarkable that it appears to owe its industrial character to the accident of the guardians having been unable to procure a qualified master at its first establishment, and so compelled to place it under the care of a practical agriculturist, who, though deficient in literary acquirements, was possessed of a good moral character, and a determination to do his duty to the best of his ability. In this case, both as regards the origin and the progress of the industrial school, the course pursued was thoroughly practical, and it is particularly stated by the poor-law inspector, that neither in the architectural arrangement of the workhouse, nor from any other cause than the efforts of an energetic and enlightened chairman and board of guardians, and of a very zealous staff of officers, does this union enjoy peculiar facilities for affording to its poor children a thoroughly good and useful education. So that what has been effected there by the judicious introduction of industrial training may be done elsewhere. Whether in England or Ireland, if the children be trained in the workhouse school to acts of industry, there will be no difficulty in procuring employment for them at an early age in the field or the factory, and the present prejudice against such children on account of their ignorance and awkwardness will quickly cease. The inspectors of workhouses are happily becoming more and more conscious of the importance of attending to the industrial training of the workhouse children, by means of the employment of the boys upon land, and of the girls in household work; and one of them, in his report to the poor-law commissioners, states that he has availed himself of every occasion to impress upon the consideration of boards of guardians the paramount necessity of improving this branch of workhouse management. We shall be truly thankful if anything that we have here gleaned from the report of the praiseworthy efforts now making in Ireland to establish agricultural schools, should tend to promote the introduction of industrial training into our union-houses, and into our national and other schools for the poor.

THE REAL COST OF EDUCATION TO THE POOR.

We have already ventured to repeat the doubts which we had previously expressed in a notice of the Manchester and Salford Education Bill, as to the probable success of an educational rate, and also our belief that the proposal of such a rate has originated in the notion, that the main obstacle to the education of the poor is the want of funds to provide the means of instruction. We have moreover stated, again and again, our conviction that this notion is a mistaken one, and that the grand obstacle to such education is the unwillingness of parents to allow their children to remain at school after they are capable of work and can obtain it, chiefly on account of the amount of their earnings, and partly also for the sake of their being trained, by actual practice at the earliest period, to habits and acts of labour, as being essential to secure them employment and to render their labour more profitable. It is vain, however, to make assertions of this kind, unless it can be shown that they are founded upon facts, and that the amount of the earnings of children really does reach a much higher sum than even the highest of those calculations at which such expensive educators as Sir James Kay Shuttleworth estimate the probable cost of the general education which it is their object to introduce and establish. This we propose to attempt in the present paper, by stating a few well-known particulars respecting the weekly earnings of children, and by then comparing their amount with that which Sir James has given, in his recent work on "Public Education," as the aggregate annual amount of income which schools as numerous and as efficient as he desires would require.

In calculating the amount of children's earnings, if we commence with what we may take as the lowest rate for those not under eight years, namely, a penny per day, or sixpence a week, the first result we come to is a sum four times as large as the three halfpence per week which Sir J. K. Shuttleworth considers that the poor ought, under his system, to pay as "school-pence." But it is well known that in agricultural districts children of eight years old and upwards earn much more than sixpence. And if such children earned only twopence per day, or one shilling a week, then every child so paid would earn half as much again as the whole cost of the weekly education which Sir James proposes, and which he estimates at eightpence a head per week. But threepence or fourpence a day may, as far as our experience goes, be taken as the rate at which boys from eight to twelve years of age are paid for their first labours in the field. Only the other day we heard of a poor man, whose excuse for keeping his little boy of ten years old from school was, that during the winter he had earned threepence a day by threshing with a small flail that he had made for him, and that the work was so well worth the money that it was only to oblige the master that he let the boy go bird-scaring during the seed-time. It is needless to prove that much higher sums are not unfrequently earned by mere children. We cannot express our sentiments upon this subject more plainly or simply than by quoting the words of Dr. Latham* at a recent meeting of the Society of Arts, when a paper by the Dean of Hereford, "On the importance of giving a self-supporting character, as far as possible, to schools for the labouring classes, and the means of doing so," formed the topic of discussion. "It was easy," he remarked, "to say that twopence, or threepence, or fourpence a week could be paid by the working man for education; but the question which he laid stress upon was, How could the labouring man pay 3*s.* 6*d.*, or from that to 6*s.* a week, for the education of his children? Now, it was a fact, that in agricultural districts boys of from six to eight years of age could earn, by weeding, sixpence a day; so that, in fact, to send them to school was paying 3*s.* a week instead of threepence; and it was mere verbiage to talk of twopence, or threepence, or fourpence, or sixpence being the price of their education, when it also involved the forfeit of their possible earnings. And, moreover, he believed that the whole tendency of agricultural improvements was to give increased value to juvenile labour."

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* See Journal of the Society of Arts, No. 24, p. 278.

Facts are stubborn things, and are not to be got rid of by ignoring them, or underrating their importance. The only rational mode of proceeding is to admit them into our calculations as what may be termed "fixed quantities," and to frame our plans accordingly. It is true, that Sir J. K. Shuttleworth, in his recent work, admits the unwillingness of parents to give up the earnings of their children, when he says (p. 97), that "the lamentable fluctuation of attendance in the lower classes, which receive not only the youngest scholars but the children of parents whose vagrant life, unsettled habits, carelessness, poverty, or dissipation cause the attendance of their children to be both uncertain and short in duration, still causes those columns in the tables which record the lowest attainments to be swelled by the highest averages." But how does he propose to remedy this? His words are:—"The evil here recorded can be removed only by raising the popular estimate of the value of education; strengthening the force of the motives to forego the small present gains of the early employment of children, for higher but more remote advantages; increasing the facilities for school attendance; and generally raising the moral and physical condition of the poor." We will not now stop to consider how far the methods here suggested are likely to prove successful, nor will we venture to question his assertion that by their application some progress has been already made in this direction, but in support of the subject of our paper we must ask, Is it a fair description of earnings, such as we have described, to call them "small present gains?" At p. 290 of his new work, Sir James himself asks, "Is it reasonable to expect, that upwards of three millions per annum should be raised by a voluntary tax on the benevolent for the efficient education of the poor?" May we then presume to inquire, whether it be more reasonable to expect that the poor parent will be willing to give up half as much more as a "small present gain," which he must do in the case of every shilling of his child's weekly earnings that he may forego for its education? For it must be remembered that the above-mentioned three millions is the annual aggregate amount of income which will be required for the education of about two millions of children, not at one shilling, but at eightpence a week per head.

Really the matter is too plain to need further illustration. But we have promised a comparison of totals, and we will give it. Three millions sterling, then, represent pretty nearly the yearly cost of the proposed education of two millions of children at eightpence weekly per head. The same amount of three millions sterling represent the earnings of less than 700,000 children at two shillings per week each. Three millions would be an unreasonable sum, according to Sir James, to expect from the benevolent for the efficient education of the poor; but, by fair inference from the language of the same authority, such a sum would be but as a "small present gain" for the poor parents of 700,000 poor children to forego, when compared with the higher but more remote advantages to be derived from such a sacrifice. If we suppose these 700,000 children to earn three shillings or four shillings a week each, which is no very extravagant supposition, their yearly earnings are then represented by totals of more than four and a half and six millions respectively—sums which leave the total yearly cost of two millions of children, according to Sir James's scheme, far enough behind. And it may be observed that 700,000, or a little more than one-third of these two millions, may be taken as a fair representation of that proportion of the whole number actually at school, who as regards age may be considered capable of earning more than the whole cost of their instruction. For it is stated by Sir James (p. 95), that "the proportion of children in all the schools together, under eight years of age, amounts very nearly to 50 per cent.:" so that nearly half the whole number are eight years old and upwards. These observations may suffice to show both how formidable an item, in the cost of the education of his children, the sacrifice of their earnings must be to a poor man, and also how large a proportion of those now under instruction are constantly liable to have their schooling stopped whenever they can procure employment, in consequence of the importance of their earnings to their parents. Nor must it be forgotten that the mere amount of these earnings is often far from being the true measure of their actual value. For though we are fully aware that in many cases children may be able to earn something only during a portion of the year, yet we well know also that those occasional earnings are not unfrequently of tenfold greater importance to their parents than is expressed by their bare amount. In agricultural districts it is just at the beginning of spring when children most readily get work; and it is also at that period when the resources of the agricultural labourer are generally the lowest. Through scarcity of work or irregularity of employment, together with the extra expenses of fuel and clothing during winter, he is wont to find towards its close that he has reached the extreme limit of trust at the village shop, and that he must either pay for everything or go without. At such a time every penny is of no small moment, and the child must either go to work or starve—especially when by going to work not only are the school-pence saved, but at least eight or twelve times their amount added to the weekly income. In such a case, to attempt to lessen the importance of the children's earnings by speaking of them as "small present gains," when compared with higher but more remote advantages, is indeed a mere waste of words.

It appears to us to be equally useless to ask, how it may be possible to raise the popular estimate of the value of education to the standard of a compensation for the loss of such earnings. It is all very well to talk of increasing the facilities for school attendance, and of generally improving the moral and physical condition of the poor, but what substitute will anything of this sort prove for the loss of two shillings, or three shillings, or four shillings a week to a poor man? In his calculations Sir James has presumed that the effect of rendering the schools of the Church of England efficient, will be to raise the average attendance of the scholars from 56 to 90. If he had allowed due weight to the importance to the poor man of his children's earnings, or shown how some immediate compensation might be provided for their loss, or how that loss might be materially reduced, we might have entertained some hope of his calculations proving correct. But since such is not the case, we must continue in the belief, that the only system of education that will prove generally successful and truly beneficial, is one that does not require the sacrifice of the children's earnings, or, in so far as it does require it, provides compensation by increasing the skill and capability of the children for acts of industry. And happily we are not without evidence that such a system may be devised and put in successful operation—a system that will ensure the continuance of a certain amount of education in early youth, after the children become capable of labour, without any considerable sacrifice of their earnings, and at the same time render them better qualified both in mind and body for their peculiar callings. Such a system (as we endeavoured to show in our last Journal) has been introduced into the schools attached to their factories by the directors of Price's Patent Candle Company. In their case, by means of the schools, literary instruction is provided within the manufactory, and is thus brought into combination with the daily work and made subservient to it. In the case of the agricultural schools in Ireland and elsewhere industrial training is joined with other instruction, and whilst the children are still at school they are gaining knowledge and skill and manual dexterity, whereby their labour, when they obtain employment, will be of greater value. Thus, in the one instance, education is procured without a sacrifice of the earnings; and, in the other, such education is furnished as will not fail to increase the amount of the earnings whenever they commence. Such a system of education, therefore, not only involves no heavy sacrifice, but confers positive and immediate benefits; and we believe that the generality of the poor would be not only able but willing to pay for it.

We have on former occasions expressed our belief that the expense of providing instruction is not the main obstacle to the education of the poor, nor one which may not in a great measure be overcome by voluntary exertions. This has been recently shown in so satisfactory a manner, in some remarks on the government measure of education by Mr. Edward Baines in the "Leeds Mercury," that we are tempted to refer to them for a confirmation of what we have advanced as to an educational rate being uncalled-for in a pecuniary point of view, and possessing little or no tendency to increase the number of children under education. In his remarks, Mr. Baines urges the government to reconsider their measure, not only by arguing that the providing by taxation for the enormous expenditure which it is calculated to bring upon the country will cause great discontent, and that the attempt forcibly to enhance the cost of education, and to bring it under compulsory support, will disorganise much of our present educational machinery, and alienate many friends of popular improvement, but also by showing that it has been framed in ignorance of the actual extent of education in England, as exhibited by the census of 1851, and consequently with very imperfect evidence of the extraordinary progress of education within the last forty years.

From a comparison of this census with previous returns, he observes, that between 1818 and 1851, whilst the increase of population had been 57 per cent., the increase in the number of day scholars has been 212 per cent., or nearly FOUR TIMES *as great;*—the larger portion of that increase, and that which must have been attended with infinitely the greatest difficulty, having been realised before government or parliament gave any aid whatever. And in looking at the past and present state of education in point of quality, he says :—

"The dames' schools, and other private schools for the humbler classes, have often been pronounced of such inferior quality as to be nearly worthless. Now one of the most remarkable features of the age is, the extent to which these inferior private schools have been superseded by public schools.

"The *unendowed public schools*, which may be said to date their origin from 1805, and which had become tolerably numerous in 1818, show the enormous increase between 1818 and 1833 of 665 per cent. in schools, and 255 per cent. in scholars; and between 1833 and 1851 the increase of 199 per cent. in schools, and 321 per cent. in scholars. This class of schools, which is the best measure of the power of the voluntary principle in education, arose from *nothing* in 1805 to 11,367 schools with 1,253,805 scholars in 1851. From 1833 to 31st December, 1851, however, public grants were made in aid of the building, enlarging, or repairing of 3474 schools, containing accommodation for 532,350 scholars, with about 400,000 scholars belonging to them; the grants were about one-third of the actual cost; nothing was granted towards the annual expense of supporting the schools, except certain allowances to teachers and monitors from 1847 downwards.

"The *private schools*, under the impulse given to popular education, increased between 1818 and 1833 no less than 108 per cent. in schools, and 87 per cent. in scholars; but being inferior in accommodation, attractiveness, and educational efficiency to the unendowed public schools which were rising up so rapidly, the private schools for the humbler classes have declined since 1833.

"The share which government has had in creating and sustaining all the mass of educational apparatus in England seems to be, that it has contributed *one-third* of the cost of school buildings for about *one-fifth* of the scholars (for 400,000 out of 2,108,473); which therefore represents as belonging to government about *one-fifteenth* of the *school-building power*, and NOTHING whatever of the *school-sustaining power* (except the extra allowances to teachers and monitors, since 1847). The remaining FOURTEEN-FIFTEENTHS of the *school-building power*, and the WHOLE of the *school-sustaining power*, have been furnished by *the people themselves;* and immensely the larger part of it in the day in which we live. And all this is exclusive of the Sunday schools, towards which the government has done nothing."

These statistics, as Mr. Baines justly remarks, show not merely the power which the people possess of creating and sustaining schools, but also of improving their character, and even quite changing their structure, without government help; although, as he very properly adds, there is no doubt that the grants and regulations of government have had an influence in improving the character of schools of late years.

After giving these and other statistics from the census of 1851, he quotes from Sir James Kay Shuttleworth's recent volume on "Public Education," to prove that the new plan proposed by him and by Lord John Russell, whom he styles the parliamentary foster-father of Sir James's plan, is a measure for swelling the annual cost of elementary schools for the working classes (exclusive of the cost of inspection and the establishment of the Committee of Council) to THREE MILLIONS sterling a year, of which TWO MILLIONS *are to be levied by rates and taxes, in addition to the present parliamentary grants.* Sir James considers that the education of one in eight, that is, of 2,240,346 out of a population of 17,922,768, ought to be provided for in public schools. But it appears from the census that the children already in day schools in England and Wales in 1851 were 2,108,473, of which 1,407,569 were in public schools, so that the day scholars were then already within 131,873 of the number Sir James's own idea requires. Hence Mr. Baines infers that Sir James, when forming for this object a plan involving according to his own estimate so enormous an expenditure as 2,938,499*l.*, must have been ignorant of the result of the census in 1851. And this applies equally to Lord J. Russell as the proposer of that plan in parliament, who indeed, as Mr. Baines notices, acknowledged that he had only obtained the result of the census on the day before he made his speech.

We have not, however, cited Mr. Baines's remarks, in order to show that the government scheme has been framed in ignorance of the result of the census of 1851, but because they appear to us most fully to confirm our assertion, that pecuniary assistance is not what is mainly needed at the present period to promote education among the poor as the proposed enforcement of an educational rate would seem to imply. Of children, yet in the state of childhood, there appears, from the above extracts, to be already nearly the full proportion under education, and that there is in many places more than sufficient school accommodation. This, Mr. Baines says, is certainly the case at Leeds, where many large schools are distressingly empty.

And as regards Manchester the evidence of the Rev. C. Richson, before a parliamentary committee, is quoted both by Mr. Baines and Sir J. K. Shuttleworth to the effect, that "out of the vast amount of school accommodation provided there only *one-third* is yet brought into use; the remainder being unused, chiefly from the want of scholars." It is mentioned that, notwithstanding these facilities in respect to day-school attendance at the present time, it is worse than it was seventeen years ago. It is also stated, as one of the general results of an extensive inquiry at Manchester from door to door, that "out of 31,374 children between three and fifteen years of age, *not at work*, 39 per cent. were kept from the school on account of the alleged inability of the parents to afford to pay the school fees. Probably," it is added, "in many cases this inability was induced by the improvidence or intemperance of one or both of the parents: but, be this as it may, 12,067 children out of 31,374 were found among the labouring and poorer classes deprived of education, as the consequence of the poverty or misconduct of their parents." How far this evil would be remedied by the introduction of an educational rate, which also requires a payment from the parents, remains to be proved. In advocating such a measure, in order to supply the poor with instruction which will cost eightpence a head at an expense on their part of not more than three halfpence or twopence, Sir J. K. Shuttleworth asks with reference to the above statement concerning Manchester:—"Can we, then, with these facts before us from the metropolis of manufacturing industry, hope that the labouring classes, even in those seats of trade where they are in receipt of the most abundant earnings, should at an early period consent to tax themselves to the extent of ninepence or one shilling weekly, for the education of their children?" We cannot let this question pass without again asking, with respect to children capable of work and able to get it, whether we can expect that parents, who are unable or unwilling to pay ninepence or one shilling weekly for their children's education, will be better able or more willing to forego for the same object two shillings or three shillings a week from their earnings?

As to children not at work, but capable of it though for the present unable to procure it, we can think of only one method likely to induce all parents, especially the improvident and intemperate, to send them to school, even at the moderate payment proposed by Sir J. K. Shuttleworth. In a letter by Mr. J. P. Wilson, published in the special report of the Directors of the Patent Candle Company, he suggests the establishment of a self-supporting school outside the factory, from which to select and promote the oldest and best of the boys into the factory free school, and from thence, as opportunity offers, into the work, so that the boys annually taken into the factory should be the best of a much larger collection. The chance of so great a prize for good conduct, as a boy obtaining good and regular work, would afford a strong inducement to parents to send their children to school; and the disposal of it would give the master much greater influence, both over children and parents, than that possessed in an ordinary school. The prospect of so speedy a return for the sums expended upon the education of their children would reconcile parents to the payment whilst they are incapable of work, or unable to procure it; and when they are capable of it, and can obtain it, there would be no objection to give up a part of their earnings to pay for such schooling as they may obtain at the intervals when work may be slack. The employers, too, being benefited by this system, as supplying them with better workmen, would feel it to be for their own interest to contribute to the encouragement and efficiency of schools so constituted. These contributions would be made far more readily and liberally than the payment of any educational rate. Under such a system nothing so unpopular as compulsory payment, nor so un-English as compulsory attendance, would be needed, for where no higher or better motive could find place, a sense of present self-interest would suffice.

One very important point connected with the establishment of such schools is doubtless the kind of education most likely to render them generally beneficial. But this is a matter in which the employers are so much concerned, that their attention ought to be specially turned to it, and their most careful consideration bestowed upon it. Not only their concurrence but their active co-operation is essential. This has been the foundation and the mainspring of the great success of the schools established by the Directors of the Patent Candle Company. And we hail it as one of the most promising omens of the speedy success of the system we are recommending, that the Society of Arts have taken up the subject. Most happy are we to conclude our remarks with the following extract from their journals,* containing an account of the able manner in which that successful educator, the present Dean of Hereford, touched upon this head at one of their meetings:—" Since my undertaking to read a paper before your society on this subject, I have been asked the question, 'What business has the Society of Arts with education?' This question may imply some degree of censure for your doing so, and I am not sure that it did not—I anticipate something of the kind may arise;—but whether it does imply censure or not, I conceive it to be a matter of the greatest public importance that you have done so; and I also feel that you have, in a greater degree, perhaps, than any other existing body, the power of giving an impulse to that element in our popular instruction (I mean its having a practical and industrial character), the want of which has for many years made it so fruitless, and gained for it so little hold on public opinion.

" Certainly a much more sensible question to have asked would have been, 'In what way can the Society of Arts not promote the cause of education?' There are so many ways which must occur to yourselves in which you can do this, and in which you are better judges than myself, that I will not venture to suggest them."

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* Journal of the Society of Arts, No. 23, p. 268.

MINUTES OF THE COMMITTEE OF COUNCIL ON EDUCATION, 1852-3.

THE financial statement of the Educational Committee of the Privy Council has just been laid before both Houses of Parliament, together with the inspectors' reports upon the condition, progress, and prospects of elementary education in the schools under inspection. The following summary of the statistics of these schools will be acceptable to all interested in the work of education. We give in two columns, side by side, the expenditure under the various heads for the year ending December 31, 1852, and in the second the total expenditure up to the same date, from the time when the minutes first came into operation, 1839 :—

	For 1852.			From 1839.		
In building, enlarging, repairing, and furnishing *elementary* schools	£33,471	8	4	£439,980	6	5½
Ditto, ditto, *normal* or *training* schools .	15,996	18	5	118,099	14	0
In providing books and maps . . .	2,645	18	9¾	9,793	5	10½
In augmenting the salaries of certificated masters and mistresses	16,975	9	10	49,918	18	4
Stipends to pupil teachers and gratuities for their instruction	79,587	0	5	243,369	8	9
Annual grants to normal schools . . .	17,545	3	11½	53,076	9	8½
Industrial schools	191	10	2	327	14	6
Pensions to teachers	70	0	0	140	0	0
Inspection	19,402	13	10	123,092	7	11½
Administration (Council Office) . . .	1,974	18	3	15,278	19	4
Poundage on post-office orders . . .	527	2	0	1,596	12	6
Agency commission for collecting books and maps	467	18	4	1,615	9	6
Total	£188,856	12	4½	£1,056,289	6	11

The total number of certificated schoolmasters is stated to be 1966, and the total number of certificated schoolmistresses 909. Of this number 109 masters and 48 mistresses have from some cause left the profession, or are not known to be employed in teaching.

The number of male and of female pupil teachers under apprenticeship on the 31st December, 1852, is 4011 and 2169 respectively, or together 6180.

The number of schools inspected during the year by 33 inspectors is 2809, giving an average of 100·3 each, at a total cost, as given in the preceding table, of 19,402*l.* 13*s.* 10*d.*, or 587*l.* 19*s.* 2½*d.* for each inspector. It should be stated, however, that upwards of a thousand more schoolrooms were visited than the number stated above; because a large number of schools consists of a boys' and a girls' school; but they would generally be visited in the same day. Some portion of the time of nearly all the inspectors is employed with the Easter and the Christmas examinations. The average cost of each inspector as here shown is much lower than his actual cost, in consequence of the appointment of several towards the end of the year. The summary gives the expenditure separately of two inspectors only; one has evidently been very recently appointed, as up to December 31 he had received 49*l.* only. The other, Mr. Marshall, has been appointed several years, and doubtless the sum attached to his name is a fair average per annum for each, 729*l.* 15*s.* The five workhouse inspectors average rather higher than this sum. There are at present 33 inspectors, but the preceding average is taken upon 28, as five are employed in workhouse schools. The schools inspected contain accommodation for 470,813 children; the average attendance was 373,159, and 354,442 were present at the examination.

The following table represents the proportion per cent. of the whole expenditure (188,856*l.* 12*s.* 4¼*d.*) received by the various classes of schools, inclusive of inspection and all other expenses, except about 1 per cent. to seven officers employed at the Council Office in the education department:—

Church schools	60·7 per cent.
Scotch ditto	12·7 „
British ditto	9·1 „
Wesleyan ditto . . .	8·3 „
Workhouse ditto . . .	4·1 „
Roman Catholic ditto . .	4·0 „

It should be stated, however, that 2 per cent. (exclusive of inspection) of the 4·1 per cent. opposite workhouse schools is the proportion of the grant received by Kneller Hall as a training school for workhouse masters. The outlay upon this establishment last year is:—General expenses, 3365*l.* 1*s.* 9½*d.*; fitting up laboratory, 319*l.* 10*s.* 3*d.*; gratuities to certificated students, 140*l.*; Queen's scholars, 17*l.* 10*s.*; giving a total of 3842*l.* 2*s.* 0½*d.* The remainder of the 4·1 per cent. is made up principally by the cost of inspection, all disbursements for workhouse schools being met by a separate grant for that purpose to the Poor Law Board. The total cost of inspection throughout Great Britain is 10·3 per cent. of the whole educational outlay. On referring to our summary of the financial portion of the minutes of May, 1851-2, it will be seen that this proportion is much higher this year than last. The Rev. F. C. Cook, in his report (1852-3) of the metropolitan schools, states that the average salary of each certificated master in 138 schools in his district is 65*l.* or 66*l.*; the Rev. H. Moseley has calculated that the average salary of schoolmasters throughout England and Wales is 32*l.*: hence, about 12 certificated teachers in metropolitan schools obtain an income together equal to the inspector's, and extending the calculation to all elementary teachers in England and Wales, the number 12 rises to 23.

One noticeable point in the minutes is that, in June, 1852, 160,000*l.* was voted by Parliament, and yet the Committee of Council have found it necessary to disburse 188,856*l.* 12*s.* 4¼*d.*, a sum exceeding the grant by 28,856*l.* A second, is the large outlay upon the training school for workhouse masters. The balance sheet states that Kneller Hall has cost little short of 50,000*l.* since its establishment in 1850. It is also remarkable, in reference to the number of scholars attending the schools under inspection, that two only of the inspectors report as many in attendance on the day of examination as the average given. In the metropolitan district the difference is nearly 1000, and in some instances it rises to 2000. Altogether the average attendance exceeds that of the day of inspection by 18,717 scholars.

SKETCH OF A LESSON ON COAL.

The following sketch exhibits, under heads 1, 2, and 3, *a method* that may be adopted in giving the lesson. The teacher is supposed to employ, to some extent, the *elliptical method,* the words in *italics,* preceded by this mark (—), indicating the answers of the children collectively or *simultaneously.* The other answers are supposed to be given *individually.* The frequency of ellipses in a lesson depends upon the ages of the children,—the youngest requiring to have recourse to them oftener than those who are more advanced. Great care is necessary, in using this method, that the answers educed are such as are natural and to the point. For the most advanced classes, the methods given in Vol. IV., p. 96, are the best.

The teacher is supposed to have specimens of the several sorts of coal for the children to examine.

I. *Qualities, &c.*—We shall examine one of these pieces. Tell me its colour. *It is black.* Let that boy feel it, and tell me what he finds. *It is rough.* Any thing else? *It is hard.* Nothing more? *It is cold.* We have now found some of the qualities of coal. Coal is—*black,* and—*hard,* and—*rough,* and—*cold,* to the touch. If I were to put a piece of coal in the stove, what would happen? *It would burn.* I shall now write on the board a word which expresses this—combustible. We say, then, that coal is—*combustible* because it will take fire and—*burn.* Tell me some other substances that are combustible. I will take you in order,—*wood, paper, a string, cotton cloth,* &c. Look again, carefully, and try and find some other quality. *It is opaque.* Very good; but what do you mean by opaque? *That which cannot be seen through.* Hold the coal up to the light. *It glitters; it shines; it is bright.* Yes, the light falls on the coal, and is thrown back from the coal to our eyes, and we perceive that it is—*bright.* Sometimes we perceive on one piece a great many colours; it sparkles and shines like gold and silver, and appears to have colours like the rainbow.

We have now found some of the *qualities* of coal. It is—*black,—hard,—rough,—cold,—combustible,—opaque,—bright.*

Question before proceeding further.

II. *Where coal is found.*—Some of you can tell me the name of a place from which we get coals. *Newcastle.* That is one place, but there are many other places besides that; if this were not so, coals would be very dear indeed. Why should they be dear? Because they would be—*scarce,* or not—*plentiful;* and when there is a scarcity of any thing, it becomes—*dearer.* Look at the map, and I will show you some of the places in which coal is found. I have shown you many counties containing—*coals,* and because they cover large tracts of country we call them fields,—the coal-fields of England. Thus, we have the Northumberland and Durham coal-fields; the Cumberland; the South Lancashire; the York, Derby, and Nottingham; the North and South Staffordshire, &c. Coal is also found in Wales, Scotland, Ireland, France, Belgium, &c.

All our large manufacturing towns are situated on or near these coal-fields. Thus, we have Manchester, Leeds, Birmingham, Sheffield, Glasgow, Stafford, Derby, &c. (These places to be shown on the map, and the pupils to tell the coal-fields on which they are respectively situated.)

Examination.

III. *How coal is obtained.*—How do we get coal? *By digging for it under the ground.* What is the place called from which coal is dug? *A mine; a coal-pit.* And because we dig it out of a—*mine,* we call it a—*mineral.* Those who dig in mines get the name of—*miners.* Those who work in coal-pits are also called colliers, and the place from which coals are dug is termed a colliery. What is a colliery? And what is a collier? What a miner? Men and boys go down into the bowels of the earth in order to get us coals. Coals lie in beds or seams, and they are dug out of these—*beds* or—*seams** by means of sharp-pointed picks. One set of workmen digs out the coal, another takes it to the bottom of the pit; it is then drawn up to the surface by means of machinery.

Some pits are very deep, and go a long way under the earth. The seams or strata are sometimes worked under the beds of rivers, and even under the sea. The miners can hear, when working, the roar of the waters above their heads. The coal-mines at Whitehaven in Cumberland, and at Borrowstowness in Linlithgowshire, Scotland, are of this description.

Some seams are thin; when this is the case, the colliers are obliged to work on their sides. You see that the labour must be very hard or severe. The colliers are, however, a hardy race, and well fitted for their occupation. To enable them to see they have a small lamp which, when passing through the mine, they carry on their foreheads, being kept there by a bent wire which is fixed in the caps or bonnets that they wear.

Questions for Examination on III.

How is coal obtained? The name of the place from which coal is dug? What other name has it? What are the workers called? What instruments do they use? What are picks made of? The proper name of the spots whence the coals are dug? Why are they called strata? When dug out of the seams, where are the coals taken to? How are they conveyed to the surface? What is remarkable about some of the coal-pits? Where is Whitehaven? What makes the labour of the colliers sometimes very severe?

IV. *Uses of Coal.*—To heat our houses; to cook our food; to drive machinery, vessels, &c.; to make gas† to light our houses and streets. Coke is also made from coal, which is largely used on railroads. From coals we get soot, which is used as a manure; the ashes are employed in making bricks, &c.; a kind of tar is obtained from coal, with which wood, palings, &c., are covered in order to preserve them.

Examination.

V. *Dangers connected with Mining.*—These may be referred, with respect to the working of coals, to *fire damp, choke damp,* and *inunda-*

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* The word *strata* may also be given.

† The manufacture of coke and gas will form separate lessons.

tions. Show here the construction and use of the *safety lamp.* Accidents, too, arise from the falling in of the earth, the breaking of ropes, chains, &c.

VI. *Miscellaneous Facts, &c.*—Show that coal is of vegetable origin, from impressions of plants found in connection with it, and from wood, with its texture preserved, existing in the beds. London requires more than three millions of tons of coal per annum; about 1200 ships are employed in conveying these. About 120,000 persons are engaged in coal mines; and the quantity of coals required in the United Kingdom alone amounts to more than 35,000,000 tons a year. Coal, in London, costs from 21*s.* to 25*s.* a ton.

Questions to be answered in Writing.

1. Describe the safety lamp.
2. Show the uses of coal.
3. Describe the process of converting coal into coke.
4. Enumerate the coal-fields of England.
5. Give the principal towns on the coal-fields, and specify the chief manufactures carried on in each.
6. Tell the meanings of opaque, combustible, strata, inundations, colliery.

W. M'L.

Notices of Books.

CONSTRUCTIVE EXERCISES FOR TEACHING THE ELEMENTS OF THE GREEK LANGUAGE, ON A SYSTEM OF ANALYSIS AND SYNTHESIS, WITH GREEK READING LESSONS AND COPIOUS VOCABULARIES. BY JOHN ROBSON, B.A. (London: *Walton and Maberly.*)

THOSE who are acquainted with the author's Latin Exercises will have no difficulty in understanding what this book is, for the plan is nearly the same as that of the Latin Exercises. The crude form system, as it is generally called, is also used.

The pupil is taught the language by writing it, and the exercises begin with the simplest words and simplest sentences. The rules and the vocabularies supply all the information that a boy wants, and he cannot make many mistakes, if he uses moderate care. In the Latin work the reading lessons are placed altogether at the end of the book, but in this work the reading lessons are placed one by one after each exercise. Thus, in Part First, after the rule for the formation of the nominative and accusative singular from the crude form of masculine and feminine nouns which end in certain vowels, and after some other remarks, there is the first exercise, which consists of the simple sentences, " 1, The man is leading a horse; 2, Exercise increases strength," and so on. This exercise is followed by a Greek lesson, consisting of such sentences as, " 1, *ὁ αετος διωκει τον ανθρωπον*; 2, *ὁ ἱππος τον αγγελον φερει.*" Here the exercise and the reading lesson come together, and the teacher can take the reading lesson first if he prefer it. The author, in his First Part, of one hundred and two pages, teaches "the inflections of nouns, and the tenses of the active verb in the indicative mood." As boys have learned some Latin before they begin Greek, they have not all the difficulties to contend with that they have in learning Latin; and they might be carried through this part in a few months. Now the question for a teacher is, will they have learned well the inflections of nouns and the tenses of the active verb in the indicative mood? For if they shall learn that on Mr. Robson's plan, they will accomplish what many boys never learn well, though they spend years over Greek. It is a very painful experience of most teachers who have to instruct boys in Greek, that very few of them ever know the various forms of the language as correctly as they ought.

It does not seem possible for a student who goes through this first part with a careful teacher not to learn all that the author professes to teach by it. But he will have learned more. He will have acquired a large stock of words, and some knowledge of the forms of the simplest sentences.

The Second Part contains exercises and reading lessons on "the verb ες—be; all the indicative tenses of passive and middle verbs; and the principal pronouns." The Third Part contains "the infinitives, participles, and other verbal derivatives." The Fourth Part contains "the subjunctive and imperative moods;" the subjunctive comprehends the mood commonly called the optative, a term which the author has dropped, and certainly nobody will feel the loss of it. The Fifth Part contains "the verbs in μι." The reading lessons are not continued beyond the Third Part. It is the author's design that this book should be used alone until the scholar reaches the beginning of the Fourth Part, "because at that point he believes Xenophon's 'Anabasis' may be begun to be studied in conjunction with the subsequent portion of the work." There is no doubt that a boy who has learned the first three parts will have no difficulty in reading Xenophon's "Anabasis," particularly if the master will at first give him a little help by reading over the lesson. But the author thinks that if a boy goes through the whole book before he reads any Greek author, he will not lose by it, but will rather gain.

The exercises and lessons in the First Part are chiefly composed by the author; but as they are very simple sentences, and the author has taken great pains with them, there is probably neither word nor expression to which any objection can be made. With very few exceptions the sentences, both in the exercises and the reading lessons in the following parts, are taken from the best Greek writers, and chiefly from Xenophon, to which writer the author designs his work as an introduction.

The author has given at the end of the book an Appendix, containing "Synopses of Inflections," where the learner will find the nouns and verbs declined and conjugated as in the ordinary grammars, but with some variations and improvements. The crude form is marked and separated from the termination, both in the nouns and in the verbs. Those who prefer it may make the boys commit to memory these forms, who will thus learn to distinguish the real word from its accidents,—a kind of knowledge which will prevent many false notions from being acquired, and will render unnecessary the rules of the Eton Greek Grammar and other like grammars for the formation of cases and tenses. In the present state of Greek and Latin philology, those teachers who do not instruct the boys in the true etymology of the Greek and Latin languages are much in arrear. Those to whom it is new will not find it difficult, if they will only look at it without prejudice, and give the system a fair trial. We all find it difficult enough after attaining a certain age, to receive new ideas: it requires some effort to overcome indolence and the force of habit. But the matter is one that concerns the interests of many teachers; for a truth is beginning to be comprehended, and it is a truth, that the little that is learned of Latin and Greek is not worth the time that is spent over it. If the languages are learned well enough to enable a man at any time of his life, if he chooses, to read a good author, the labour of his youth is not misspent. But it is no argument to say, that though a boy does not acquire this command over these languages, he gets something that is worth having; for the question is whether his acquisition, whatever it may be, and whatever it may be worth, is an equivalent for his time and labour. It is now becoming a common opinion that it is not, and the opinion is true.

There is another consideration for teachers. If they reject a new thing, even when the new thing is recommended by its own plain merits, they must let younger teachers seize on that which they are too indolent to lay hold of, and so they may in the end lose their pupils.

Mr. Robson's book may be used, as it has been hinted, in a different way from that which he recommends. But in whatever way it is used, it will lay a good foundation on which the pupil can build. It is not supposed, by the writer of these remarks, that there is any one mode of teaching only, and no other. Different teachers have different methods, but there must be some common principle. A very good teacher and very clever pupils will contrive to teach and to learn; but for teachers and boys in general some plan is necessary, and it is well worth the trouble for those teachers who are earnest about their work to consider what Mr. Robson, who has had great experience in teaching, says in his Preface.

Mr. Robson's plan of teaching consists in making the boys begin with writing Greek. For a modern language, this is the best plan; and it may be the best plan for learning an ancient language. He says, however, and the remark is important, that the object of the whole system is not to teach a pupil "to write Greek, although to a certain limited extent that is one of its incidental results; but to prepare him to read the classical authors at as early a period as is consistent with accurate knowledge and real ultimate progress," &c. To learn Greek in order to write Greek is an absurd idea; to write it to some extent, in order to learn it, is a different thing. Writing gives greater accuracy and certainty of knowledge; and this is the only good reason why boys should write Latin and Greek exercises. It is very likely that a boy who goes through this book and masters it well, will write better Greek than many boys who are trained to write Greek as if it were one of the ends of studying the language.

G. L.

AN EASY AND PRACTICAL INTRODUCTION TO THE FRENCH LANGUAGE. BY JOHN HAAS, TEACHER OF MODERN LANGUAGES, QUEENWOOD COLLEGE, HANTS. THIRD EDITION. (London: *Darton & Co.*)

This little book is a translation from the German of Dr. Ahn, adapted to English education. A translation of this work by Mr. Hall has already been noticed with commendation in this Journal. They are both fair exponents of the method of Dr. Ahn, the peculiarity of which consists in presenting certain sentences equally simple in both the English and foreign languages (as adapted to English), and leading the child progressively to more difficult ones till he has mastered a considerable vocabulary, and, intuitively, a large portion of the grammar of the language. The plan is not new; in fact, it is merely an application to a foreign language of the system by which every child learns its mother tongue. The child is by practice taught the elements of the language before dry grammatical rules are given to him. The plan is a natural and easy one, and well adapted to the capacities of children. It must, however, be borne in mind that the system necessarily implies and demands a thorough teacher; and it is, after all, the living teacher in whom the virtue resides, and not the inanimate book, whatever may be its plan. French may be taught as effectively by a good teacher, with *Charles Douze* for a text-book, as with books prepared on the most elaborate and captivating system.

DICTIONARY OF GEOGRAPHY. EDITED BY DR. SMITH. (London: *John Murray.*)

A NOTICE of this work appeared some time ago in these pages, the present and the antecedent numbers fully bear out the favourable opinion we then expressed upon this admirable geographical dictionary. It is throughout characterised by the same accuracy and fulness of information which render the corresponding Dictionary of Mythology and Biography so valuable an addition to our classical literature. The editor appears to have necessarily abandoned the project of completing the book in one octavo volume. It will, we imagine, from its present state, rival in size its companion work.

PRACTICAL BOOK-KEEPING, COMMERCIAL REFERENCE, AND COUNTING-HOUSE AND SCHOOL ASSISTANT, ETC., ETC. BY THOMAS SMITH. (London: *Simpkin & Co.*)

MR. SMITH writes as a merchant who has experienced all the inconvenience of a defective preparation while at school for the duties that were afterwards to devolve upon him. His book contains an admixture of book-keeping, commercial correspondence, and advice. It is addressed to a particular class, clerks in merchants' counting-houses, and to those aspiring to the office stool. The commercial hints and mercantile letters will doubtless be found to be serviceable to such as intend to enter the counting-house; but the work can scarcely be recommended for adoption in schools generally. The book-keeping proper consists of single and double entry, and has a special reference to the same class of students. The writer has evidently had considerable experience in booking mercantile transactions, and in the superintendence of the transactions themselves. He is desirous of bringing his experience to bear upon the prospects of such young men as may be called upon to follow in a similar course.

THE PEOPLE'S CHANT-BOOK: A COLLECTION OF SINGLE AND DOUBLE CHANTS, IN VOCAL SCORE; WITH AN ACCOMPANIMENT FOR THE ORGAN OR PIANO-FORTE, DESIGNED FOR THE USE OF CONGREGATIONS AND SCHOOLS. EDITED BY JAMES TILLEARD. (London: *Novello.*)

THE present general acquisition of musical knowledge in our national schools, through the introduction of Wilhelm's method as adapted to

English education by Mr. Hullah, and the scarcely less general diffusion of musical taste (humble though it be) among the lower classes by the excellent cheap publications of such publishers as Novello, render this collection of chants peculiarly acceptable in itself and appropriate in its title. When we say that its extreme cheapness is its great recommendation, we by no means wish to imply that it is not good at the same time. There is no great novelty presented in the collection, nor was it to be expected with its aims and objects. There are twenty-four single and the same number of double chants, selected principally from our best composers in church music. No editorial liberties have been taken with the arrangements, and the selection may be said to be judicious, considering how vast a number of chants it was made from, and the great influence that variety of taste and opinion has in matters of this kind. We should recommend that when a revision is made—and we presume that a revision will be made, for in one of the editor's own chants, No. 46, the alto part throughout has been left in the G clef, while the alto clef is employed. We should recommend that for the present arrangement of the beautifully plaintive chant of Mornington in E flat should be substituted the arrangement sung at St. Paul's at the funeral of the late Duke of Wellington: it is arranged a semitone lower in D, and in a style that renders it at once impressive and characteristic for occasions of solemnity and mourning.

We quote the following remark from the preface, and subscribe to its correctness; it should be more generally acted upon. "In singing the *Venite*, *Magnificat*, and *Deus Misereatur* to a double chant, the last half of the chant should be repeated at the fifth verse of each of the canticles, as the connection of the words will otherwise be destroyed."

TANGIBLE TYPOGRAPHY: OR, HOW THE BLIND READ. BY EDMOND C. JOHNSON. (London: *Whitaker*.)

The object of this book is to bring under the notice of the public some of the obstacles that impede the progress of education among a class of unfortunates who have peculiar claims upon its sympathies and benevolence. It is a well-ascertained fact, that if man by some secret process of nature, or by accident, be deprived of one of the senses, the others become much more acute, and to some extent supply the place of the defective one. Thus, with the unfortunates in question, the sense of touch becomes so exquisitely delicate, that with slightly raised characters a fresh avenue by it is opened to the mind, through which a literature may be conveyed, and by which a mental gratification may be experienced that would, except to those blessed with sight, appear unattainable. The blind, from the fact that all external distractions and influences have comparatively little effect upon the mind, become highly capable of mental training. The increased powers obtained, however, by some of the faculties, can never compensate for the lost sense; and it is justly argued by Mr. Johnson, that impediments resulting from conflicting systems of parties ought to find no place in the progress of instruction among the blind. Further, that although there is so large a number as between thirty and forty thousand in this country, yet the readers among them are not sufficient to support at most more than one system. The writer does not complain of any want of enthusiasm in supplying a literature for the blind; but rather of a misdirected seal, which imposes upon them the necessity of becoming acquainted with at least half a dozen tangible languages, if they are to reap the benefits of the books published for their exclusive use.

The systems at present in operation in the various institutions for the blind may be divided into two classes, the *phonetic* and the *common alphabetical.* Of the former there are those of Lucas, Frere, and Moon; of the latter, Alston's the American, and Alston's modified. Besides these, Mr. Johnson names and illustrates the arbitrary systems of Baille and Carton, and the French alphabetical. Without following the writer through all his arguments, we conclude with him, that one general system should by common consent be adopted, and that in character so far identical with our general typography that any person who wishes to aid the blind in their early studies may not be compelled first to learn a stenographic system or language, which presents as many difficulties to the seeing teacher as to the blind pupil. We may suggest the desirability of publishing this book in the form of a pamphlet, in order that it might be circulated extensively among the friends and patrons of the blind. By this means a large amount of public opinion might be brought to bear upon the jealousies that uphold the various systems which might ultimately annihilate them.

AN INTRODUCTORY TREATISE ON MENSURATION, IN THEORY AND PRACTICE, CONTAINING THE INVESTIGATION OF EVERY PRINCIPLE, AND SEVERAL IMPROVED RULES OF OPERATION. INTENDED FOR THE USE OF SCHOOLS AND PRIVATE STUDENTS. BY J. R. YOUNG, LATE PROFESSOR OF MATHEMATICS IN THE ROYAL ACADEMICAL INSTITUTION, BELFAST. (London: *Mozley & Co.*)

MENSURATION is one of the most important applications of arithmetic to geometry, and a subject upon which a thoroughly good text-book is still a desideratum. We will not say that the one before us is not very good in any respect: it contains, probably, almost all that an introductory book should contain; still it is so wrapped up with unnecessary and difficult matter, that we are compelled to give it a place somewhere between an introductory treatise on the subject and one embracing the full scientific application of the term mensuration, and involving many branches of higher mathematical science. An introductory treatise should be limited to the application of arithmetic to geometry, so far as "to show how to find the dimensions of a figure, or its area, or surface, or solidity, by means of the *most simple measurements,*" heights and distances included. But where measurements the most simple could not be applied, allow mensuration with its more extended signification with the aid of trigonometry and conic sections to operate, but not under the title *introductory*. Such a mensuration might still be as comprehensive and far more practical than the one before us. It is difficult, however, for a writer of such a book to leave the old beaten track altogether. Because Mr. Young has cut out some few of the subjects found in our old books, he has given the work the qualification, introductory; and explains that he has done so in order to avoid criticism, as "mensuration is a term of somewhat ambiguous import." We will scarcely say that since the author considered it necessary to introduce the theory and practice of trigonometry into his work, that he was wrong in giving a dissertation on the principles of logarithms; still, the *import* of the term mensuration is not more clearly defined by so doing, nor the work made more useful as an introductory treatise. A vast discrepancy, too, is found between the statements in the preface and the practice in the body of the book. The preface says, "I have endeavoured to give to every subject included in it a very full and complete discussion, and to conduct such discussions in a manner adapted to the capacity of every intelligent schoolboy. The several practical rules are accompanied with their demonstration." Yet we find, at page 24, no demonstration of rules has been given till the problem is set "to find the area of a triangle when the three sides are given;" and this, the first demonstration in the book, is given in a manner that requires, in order to comprehend it, a considerable knowledge of algebra, and of nearly the whole of the second book of "Euclid." There are many matters well treated, but the book is too cumbersome for its title, and the last and ninth section is too small to give to the "application of principles to the works of practical usefulness." We are glad to see, for the first time we believe in a work on mensuration, that the distinction between parts and inches in superficial measure is clearly defined.

HELLENICA; OR, A HISTORY OF GREECE: IN GREEK. EDITED BY JOSIAH WRIGHT, M.A., HEAD MASTER OF SUTTON COLDFIELD SCHOOL. (Cambridge: *Macmillan & Co.* 1853.)

This is the work of a careful and correct scholar, who is already favourably known by his excellent translation of certain dialogues of Plato.

We wish it were in our power to say that his present effort appeared to us as felicitous in conception, and as likely to be practically useful, as it is accurate and complete in execution. We have however several grave objections to the plan, of which the first part is now before us, and must be permitted to express our regret that so much diligence and learning should be expended on a scheme which we believe to be ill-advised.

If it be possible to conduct the instruction of junior classes in the Greek language by means of an entire portion of one pure classical author, it surely cannot be desirable to piece together detached portions of two writers who are totally different in period, in style, and in authority. The Editor tells us, in his preface, that "he has always been at a loss what Greek book to lay first before his pupils." "Xenophon," he says, "is not unsuitable in point of style and facility of diction; but he writes too minutely, and on events scarcely prominent enough, for a beginner." If it be considered necessary to combine elementary instruction in the Greek language with the study of the facts of Grecian history, it is certainly undesirable to keep the attention fixed for a considerable period upon the details of a single battle or negotiation: but we think that a general acquaintance with the history of Greece may be much more rapidly and satisfactorily obtained from the perusal of some English compendium, and that the portions of Greek writers selected for elementary teaching should be chosen exclusively with the object of imparting clear and correct notions of the language. By attempting to combine these two operations, we run the risk of doing neither so well as it might be done. We think too that the attention of boys is much more likely to be commanded by graphic and life-like details, than by the frigid summary which Diodorus gives of the Persian war; while the rapid sketch given by Thucydides of the subsequent rise and power of Athens, though immeasurably superior to anything that Diodorus was capable of writing, is equally unsuited to captivate the fancy of early youth. We do not recommend our junior classes to be nurtured on the vapid commonplaces of Xenophon's harangues: but we are sure that the scene of confusion following the battle of Cunaxa; the treacherous slaughter of the generals of the ten thousand, and the consequent despondency of the army; the forcing of a passage through the Kurdish mountains, and the crossing of the river Centrites, and many other transactions related in the Anabasis, would be found to excite the highest interest in the learner; whilst at the same time they contain nothing but the purest Greek, and present a great variety of construction and the best opportunities of illustrating the principles of the language. The teacher should make himself familiar with Layard's descriptions of the same country, and of the recent operations of the Turkish armies against the tribes which have handed down the keys of their territory from father to son since the days of Xenophon, and who have only of late been forced to open their mountain gates to the merchant and the traveller. In this way we believe that the later books of the Anabasis might be rendered exceedingly attractive, and that some of the most important truths of history might be inculcated, and its further study promoted.

There is no nobler triumph of civilization over barbarism, and of discipline over numbers, than that of which Xenophon made and wrote the history; and there is no more valuable lesson for the children of a country which has so often owed her greatness to the same causes.

It is a common remark that the classics most in use for early instruction become thereby so dry and beaten as to yield in after years far less gratification than those which have remained untouched until considerable knowledge of their language had been acquired. This is perhaps one reason why the Odyssey is so often found more delightful than the ill-used Iliad; and we have often been tempted to wish that it were possible to reserve Virgil and Homer until the toils were over of which they usually form the instrument. In this point of view perhaps Diodorus may be recommended. There is no treasure in his pages that we need hesitate to spoil, and it is impossible to like him better or worse at the first or twentieth reading.

But if the matter of Diodorus be unattractive, how much stronger are the objections to his style. "It contains," says Mr. Wright, "a few deviations from pure classical usage, which should always be observed by the tutor." It is usually so difficult and tedious a process to acquire a correct Greek prose style, that we think it most improper to throw any further impediments in the way. We have already to caution beginners against imitating the Greek Testament and Herodotus; and now, according to Mr. Wright, we are to add Diodorus.

Surely it is quite trouble enough to a boy to learn what ἐπὶ means, with each of its three cases in pure Greek, but now he is to see them confounded in his earliest lessons. "It is well," says Mr. Wright, "to observe the of latinities of Diodorus." It would be much better, we think, to keep them out of the way of boys. All who are familiar with Greek prose exercises know that the tendency to latinize is almost irresistible without this encouragement. Again, we have always found it nearly impracticable to get boys to learn where to employ the definite article. At the very beginning of Mr. Wright's notes, we find that Diodorus is irregular in its use.

So much for our objections to Diodorus himself: but we have a further ground of complaint against his editor. We do not doubt that Mr. Wright has found the study of Rost's Greek Grammar both pleasant and profitable, and his previous knowledge of the Greek language was probably sufficient to prevent his being confused or misdirected by it; but we beg to inquire what effect he can expect to produce upon the brains of beginners by a "theory of cases" derived from such a source. We pity the little boys under this process as much as we do Americans, who are wont to perplex their clear practical intellect with mystical German speculations, which are always most in favour on their side of the Atlantic when rejected or exhausted on ours. A boy, who but for Mr. Wright would be confining his studies to the Delectus, is told that the dative case "is used to designate the relation of external connexion; it expresses a concomitance which is subsidiary to the action of the subject." Without presuming to judge what a junior class may be capable of effecting under Mr. Wright's own superintendence, we can feel no hope whatever of being able ourselves to make this intelligible to our pupils, and we do not anticipate that many of our readers will be more sanguine. Again, "the material of which a thing is formed stands in the genitive, for it may be conceived as a whole possessing the thing formed as a part. Thus, *ἐστρωμένη ἐστὶ ὁδὸς λίθου*." Certainly it may be so considered; but we should prefer teaching our boys that the stone was part of the road, and not the road part of the stone. To the note upon *οἱ βάρβαροι ἐκ τῆς χώρας ἀπῆλθον*, which occurs after Mr. Wright has substituted "the clear though hasty outline of Thucydides for the loose and sometimes blundering statements of Diodorus," and from which note we learn that "the country ceases to possess the barbarians," we make a similar objection; that the barbarians, as well as the little boys, would suppose that they were in possession of the country.

We think that Mr. Wright promises to prove a worthy successor to the late T. K. Arnold. Both have shown great learning and labour, and both have produced useful books, which may be recommended wherever the learner is carefully prevented from attending to what the writers have imported from German sources. The present work may be compared with the seventh edition of Arnold's "Introduction to Greek Prose Composition." The same merits and the same faults may be found in both. We desire to see our educational books composed under the guidance of clear common sense. It is a gift upon which we rather value ourselves as a nation, and which, at least, we desire to see propagated among our sons. Even in matters of scholarship it is of more value than German grammarians would be disposed to admit.

It is only justice to Mr. Wright to say that he has most satisfactorily corrected the imperfections of Diodorus in style and his inaccuracy in facts, and he has made many valuable observations upon difficult idioms that occur frequently in Thucydides. He trusts "that the present volume will be followed by others, which will carry on the history of Greece, and explain, on similar principles, other portions of the Greek Grammar." We would rather see Mr. Wright applying himself to more useful works in future, devoting his learning and his diligence to the preparation of school books under the guidance, not of German philologists, but of his own good sense and his experience as a teacher.

A HUNDRED SHORT TALES FOR CHILDREN, FROM THE GERMAN OF C. VON SCHMID. BY F. B. WELLS, M.A. Pp. 184. (London: *T. Bosworth*, 1853.)

THE translator of these little tales tells us, that the idea of publishing them was suggested by the interest with which his own children had listened to many of them. It would be well if every book for children were tested in like manner before publication. Such a test would seldom be found unworthy of trust, and certainly in this case it has not misled. Most of the stories contained in this collection are quite new to us, and therefore we may safely conclude that they will most probably be so to the juvenile reader. Each tale is intended to teach some moral or useful lesson, which is expressed at the conclusion, in verse. The original work, of which this collection is a translation, is used as a lesson and reading-book in the schools of Bavaria, and, the translator says, "may on every account be safely recommended as an elementary study for young learners of the German language, and may easily be procured through the publisher of this translation." The following is a fair specimen of the whole hundred which are given in full tale, and will afford a better notion of their character than any description:—

"THE ECHO.

"A little boy, named George, knew nothing yet of the echo. Once he cried out in the meadow, 'Oh, hop!' when directly he was answered from the wood close by with, 'Oh, hop!' Amazed at this, he cried out, 'Who are you?' The voice replied, 'Who are you?' He then screamed out, 'You are a silly fellow!' and 'silly fellow' was answered from the wood.

"George was very angry, and went on, calling worse nicknames, towards the wood. They were all repeated exactly the same. He therefore went to look for the boy whom he supposed to be in the wood, in order to take his revenge but could find nobody.

"So he ran home, and complained to his mother how an impudent fellow had hid himself in the wood, and called him nicknames.

"His mother said, 'This time you have accused yourself. You have heard nothing but the echo of your own words; if you had called out a civil word towards the wood, a civil word would then have been returned to you.'

"But so it is in ordinary life: the behaviour of others towards us is, for the most part, only the echo of ours towards them. If we treat people civilly, they treat us civilly in return. But if we are uncivil, and rough, and unmannerly towards them, we cannot expect anything better from them.

"Just as the words are utter'd, bad or good,
So faithful Echo answers from the wood."

ANSWERS TO THE MATHEMATICAL QUESTIONS.

QUES. 171.—*Proposed by Amicus.*

Find x from the equation—

$$\sqrt{\left(a b x-\frac{bc}{x}\right)}+\sqrt{\left(a c-\frac{bc}{x}\right)}=ax.$$

Answered by Mr. Wm. Godward, jun., E′, and Socius.

Transposing $\sqrt{\left(a b x-\frac{b c}{x}\right)}=a x-\sqrt{\left(a c-\frac{b c}{x}\right)}$,

Squaring $a b x = a^2 x^2-2 a x \sqrt{\left(a c-\frac{b c}{x}\right)}+a c$,

$$= a^2 x^2-2 a^{\frac{1}{2}} c^{\frac{1}{2}} \sqrt{(a^2 x^2-a b x)}+a c,$$

$$\therefore\ a^2 x^2-a b x-2 a^{\frac{1}{2}} c^{\frac{1}{2}} \sqrt{(a^2 x^2-a b x)}+a c = 0.$$

The square root of which gives

$$\sqrt{(a^2 x^2-a b x)}-a^{\frac{1}{2}} c^{\frac{1}{2}} = 0,$$

$$\therefore\ a x^2-b x = c,$$

and this solved gives $x=\frac{1}{2a}\left(b \pm \sqrt{b^2+4 a c}\right)$.

QUES. 172.—*From Hann's Trigonometry.*

If O be the centre of the circle inscribed in the triangle ABC, and R, r, the radii of the circumscribed and inscribed circles, then

$$\mathrm{OA}^2+\mathrm{OB}^2+\mathrm{OC}^2 = ab+ac+bc-12\,\mathrm{R}r.$$

Answered by A. M., Mr. John Godward, and Mr. W. H. Levy.

$$\mathrm{A\,O}^2=\frac{r^2}{\sin.^2 \frac{1}{2}\mathrm{A}}=\frac{(s-a)(s-b)(s-c)}{s}\cdot\frac{b c}{(s-b)(s-c)}=\frac{b c(s-a)}{s}$$

$$= b c-\frac{a b c}{s}= b c-4\,\mathrm{R}\,r \text{ (“Hann's Trig.” art. 28).}$$

Similarly $\mathrm{B\,O}^2 = a c-4\,\mathrm{R}\,r$, and $\mathrm{C\,O}^2 = a b-4\,\mathrm{R}\,r$,

$$\therefore\ \mathrm{A\,O}^2+\mathrm{B\,O}^2+\mathrm{C\,O}^2 = a b+a c+b c-12\,\mathrm{R}\,r.$$

QUES. 173.—*From Todhunter's Calculus.*

If a rectangular piece of pasteboard, the sides of which are a and b, have a square cut out of each corner, find the side of the square that the remainder may form a box of maximum content.

Answered by E′, A. M., Mr. Wm. Godward, jun., and Mr. T. T. Wilkinson.

Let x = side of the square or depth of the box; then the dimensions of the bottom of the box will be $a-2x$ and $b-2x$. Hence the content is

$$u = x(a - 2x)(b - 2x),$$
$$= 4x^3 - 2(a + b)x^2 + abx,$$
$$\therefore \frac{du}{dx} = 12x^2 - 4(a + b)x + ab.$$
$$\frac{d^2u}{dx^2} = 24x - 4(a + b).$$

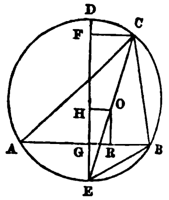
If we put $\frac{du}{dx} = 0$, we obtain $x = \frac{a + b \pm \sqrt{(a^2 - ab + b^2)}}{6}$.

When $x = \frac{a + b - \sqrt{(a^2 - ab + b^2)}}{6}$, $\frac{d^2u}{dx^2}$ is *neg.*, and u is a *max.*

Ques. 174.—*Proposed by Mr. T. T. Wilkinson, Burnley.*

Given the radii of the inscribed and circumscribed circles, to construct the plane triangle when the sides are in arithmetical progression.

Answered by Amicus, Mr. W. H. Levy, and Mr. T. T. Wilkinson.



Construction.—In E D the given diameter of the circumscribed circle A B C D, take E G = given radius of the inscribed circle, and G F = 3 E G; draw A G B, F C perpendicular to D E, and join A C, B C; then A C B is the triangle reguired.

Demonstration.—Join E B, E C, make E O = E B, draw O R perpendicular to A B, and O H to E D; then O is the centre and O R the radius of the inscribed circle ("Bland's Geom. Prob." page 247). Now E C^2 = E D, E F = 4 E D, E G = 4 E B^2 = 4 E O^2; therefore E C = 2 E O, or E O = O C; hence E H = H F = 2 E G; therefore O R = H G = G E = the given radius of the inscribed circle, and the radius of the circumscribed circle is equal to the given one by construction. Again, by "Bland," page 250, E C : E O :: A C + B C : A B; but E C = 2 E O; therefore A C + B C = 2 A B, that is A C, A B, B C are in arithmetical progression.

LIST OF MATHEMATICAL ANSWERS.

Amicus, ans. 173, 174; E′, Great Stukely, ans. 171, 172, 173, 174; John Godward, Chelsea, ans. 171, 172; William Godward, jun., Chelsea, ans. 171, 172, 173, 174; W. H. Levy, Shalbourne, ans. 171, 172, 173, 174; A. M., ans. 171, 172, 173, 174; Socius, ans. 171; T. T. Wilkinson, Burnley, ans. 172, 173, 174.

NEW QUESTIONS,

To be answered in our Number for July, 1853.

Ques. 175.—*Proposed by Mr. John Smith, Manchester.*

Given $x^4 + 4a^3x = a^4$, to find x.

Ques. 176.—*Proposed by Mr. John Thompson, London.*

From a company of 60 men, six are draughted off every night on guard: on how many different nights can a different selection be made? and on how many of these will two given men be found on guard?

Ques. 177.—*Proposed by Amicus.*

Resolve a given force into two others, whose difference shall be given, and which shall act at a given angle.

Ques. 178.—*From the Senate House Problems for* 1853, *communicated by Mr. W. H. Levy.*

If a, b, c, d be perpendiculars from the angles of a quadrilateral upon the diagonals d_1, d_2, show that the square of the sine of the angle between the diagonals is equal to

$$\frac{(a+c)(b+d)}{d_1 d_2}.$$

⁂ It is particularly requested that all mathematical contributions be forwarded, at *latest*, by the 20th of each month.

GENERAL EXAMINATION OF TRAINING SCHOOLS.

EASTER, 1853.

(*Continued from p.* 192.)

MISTRESSES.

GRAMMAR.

Section I.—1. What is meant by an *Article?* When can the indefinite article be used, and when can it not be used?

2. How are the possessive adjective pronouns formed? Decline the third personal pronoun, in both numbers, through all its genders.

3. Should *interjections* be considered as parts of speech? Give reasons for your opinion.

Section II.—Write a paraphrase of one of the following passages:—

1. "Adam, Heaven's high behest no preface needs:
Sufficient that thy prayers are heard: and death,
Then due by sentence when thou didst trangress,
Defeated of his seizure many *days,*
Given thee of grace; wherein thou mayst repent,
And one bad act with many deeds well done
Mayst cover: well may then thy Lord, appeased,
Redeem thee quite from death's rapacious claim:
But longer in this Paradise to dwell
Permits not; to remove thee I am come,
And *send* thee from the garden forth, to till
The ground whence thou wast taken, fitter soil."

2. "This is the state of man: To-day he puts forth
The tender leaves of hope; to-morrow *blossoms,*
And bears his blushing honours *thick* upon him;
The third day comes a frost, a killing frost,
And when he thinks, good easy man, *full* surely
His greatness is *a-ripening,* nips his shoot;
And *then* he falls, as I do. I have ventur'd
Like little wanton boys, that swim on bladders,
These many summers in a sea of glory;
But *far* beyond my depth: my high-blown pride
At *length* broke under me; and now has left me,
Weary, and old with service, to the mercy
Of a rude stream, that must for ever hide me."

Section III.—Parse and explain the construction of the words printed in italics in the passage which you have chosen.

Section IV.—1. Write short sentences in which the words *water, run, travel, arch,* respectively, are used as nouns; and other short sentences in which they are used as verbs.

2. What is the literal meaning of the terms *noun* and *verb;* and what is the exact use of each as a part of a sentence?

3. Give the meaning, and, if you can, the etymology of the following words:—*zest, quittance, fragment, atom, callous, ossify, haggard, meagre.*

Section V.—1. In what respects does the structure of sentences now usual differ from that which was usual two centuries ago? How did the difference come to pass?

2. Of what languages is the English language composed, and in what proportions? Point out advantages or disadvantages which it derives from its composite character.

3. Mention, in chronological order, the literary works which have been most esteemed in England from the reign of Elizabeth to the beginning of the present century; and give a short account of the works which you name.

GEOGRAPHY.

Section I.—Draw a map of—

1. The county in which your school is situated, and put in (with names) the chief towns, hills, rivers, and roads.

2. Ireland, with towns, mountains, and rivers.

3. Italy, with its principal divisions.

Add a description of the occupations, habits, &c., of the people of the country you select.

Section II.—1. Describe the situation of as many of these places as you know:—Cork, Belfast, Channel Islands, Hull, Leeds, Devonport, Perth, Montreal, Bombay, Ionian Islands, Mysore, Port Philip, Natal, Antigua, Baffin's Bay, New Orleans, Quito, Valparaiso, Brazil, Tobolsk, Pekin.

2. Name and show on a map of the world, drawn by you, the British Colonies, and tell their different products.

3. Name the exports of China, Morocco, Cape Colony, Australia, Greece, Egypt, United States, Manilla, Sandwich Isles, Guinea.

Section III.—Write notes of a lesson—

1. On the barometer and thermometer as connected with geography.

2. On the causes which affect climate.

3. On the varieties and distributions of the human race.

Section IV.—Write notes of a lesson describing the characteristics of any three animals, bracketted together—

1. Crocodile	2. Whale	3. Shark
Tiger	Wolf	Kangaroo
Ostrich	Elephant	Eagle

DOMESTIC ECONOMY.

Section I.—1. What materials would you bring under the notice of your senior girls for under-clothing? and what would you say about the comparative price and durability of the several items which you name?

2. What would be a fair price for a good pair of blankets for a bed six feet by three? What is the usual width of linen sheeting? How many yards would you require for a pair of sheets for the foregoing bed?

3. How may the tendency which worsted stockings have to shrink in washing be most effectually checked?

Section II.—1. Give full directions for boiling potatoes; and trace distinctly the whole process, from their being taken out of the sack or store to their being placed upon the table. In purchasing them, how may the best be known?

2. Give exact recipes for preparing the following articles for use, viz.:—

(1.) Barley-water.
(2.) Arrow-root, or sago.
(3.) Porridge of Scotch oatmeal.
(4.) A rice pudding, with or without eggs.

SECTION III.—1. Explain the proverb, "*Stuff a cold, starve a fever.*" What remedies would you advise for an ordinary cold? What symptoms would indicate danger; and, in such a case, what immediate precautions would be desirable if medical aid were not speedily procurable?

2. How would you treat a severe bruise, and a deep cut?

3. If a young child were seized with a convulsive fit, what steps ought instantly to be taken.

4. If it were necessary for you to apply leeches, to what methods would you have recourse in the event of their not biting readily?

SECTION IV.—Write the notes of a lesson on one of the following subjects:—

1. What are the considerations which should principally influence a young servant in the selection of her first *place.*

2. The undue consumption of bread (in proportion to other articles of food) by most cottagers' families.

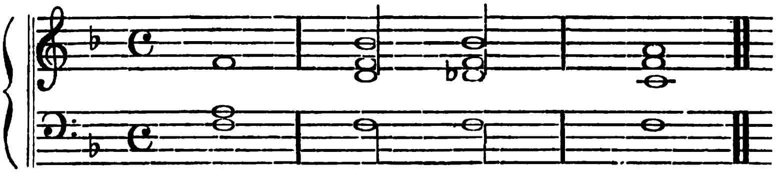
3. The necessity of a due supply of light and air in a dwelling, in order to the health of its inmates.

MUSIC.

SECTION I.—1. Write a short Essay on the importance of instruction in Music.

2. Give notes of a lesson on "Reading in Time."

3. Explain, as you would to Pupil Teachers, the principles of Simple Counterpoint. Illustrate the lesson by reference to the annexed passage:—



SECTION II.—Explain these terms—

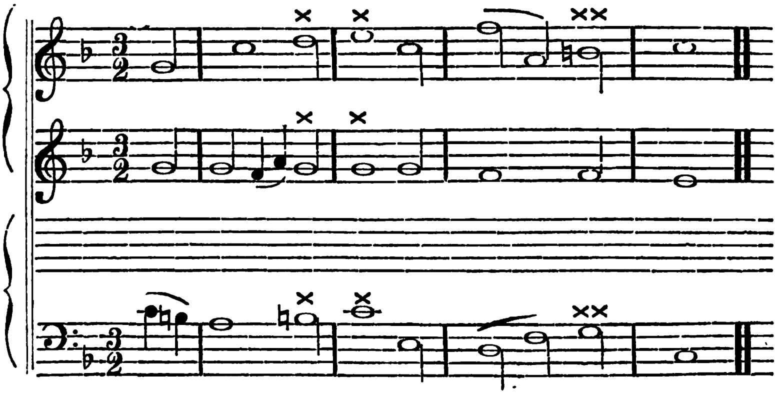
1. *Scale, minim, allegro, piano.*

Or, 2. *Bar, rest, sharp, accidental.*

Or, 3. *Discord, dominant, modulation.*

SECTION III.—In the annexed passage—

1. Name each interval in the melody and bass.



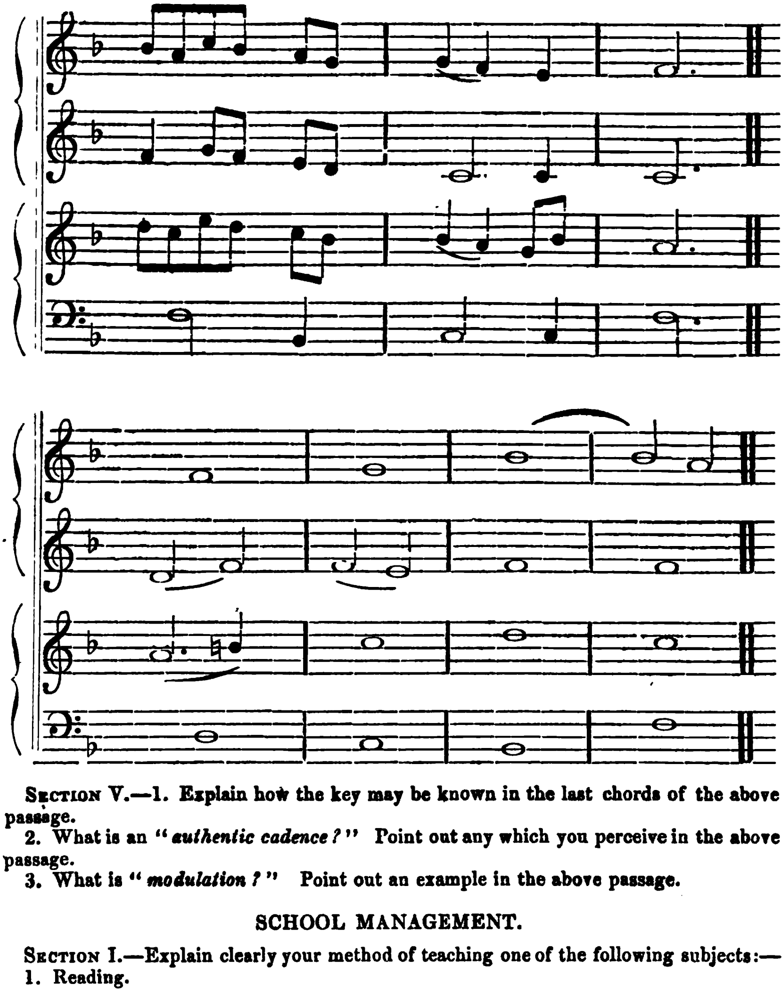
Or, 2, *Name* the chords marked × and the discord marked and × ×, show that the latter is correctly *resolved.*

Or, 3. Add on the blank stave a fourth part for a tenor voice; explaining the reason for the choice of each note in that part.

Section IV.—1. Explain fully the terms *common* and *triple* time.

2. In the annexed passage, insert the proper signatures for time.

Or, 3. Give notes of a lesson on it, as an illustration of the different lengths of the semibreve, minim, crochet, and quaver.



Section V.—1. Explain how the key may be known in the last chords of the above passage.

2. What is an "*authentic cadence?*" Point out any which you perceive in the above passage.

3. What is "*modulation?*" Point out an example in the above passage.

SCHOOL MANAGEMENT.

Section I.—Explain clearly your method of teaching one of the following subjects:—

1. Reading.
2. Grammar.
3. Geography.

Section II.—Describe the organization which you would adopt in one of the following cases and your reasons for preferring it:—

1. A mixed school of 70 children, with one Pupil Teacher.
2. A girls' school of 100, with two Pupil Teachers.
3. A girls' school of 150, with three Pupil Teachers.

Illustrate your answer by a ground plan.

Section III.—1. What heads should a good register include, and what are the advantages of keeping one?

2. Give a copy of the time-table in your own school, and state the principle upon which it has been constructed.

3. What subjects would you teach in a school attended by 80 girls, whose ages vary from 6 to 13, and in what order would you introduce them?

SECTION IV.—Write an essay on one of the following subjects:—

1. The best means of maintaining discipline.
2. The influence of a Mistress in forming the habits and character of her pupils.
3. The true aim and objects of elementary education for the female children of the labouring classes.

MASTERS.

SECTION I.—Give concisely the principal events recorded in one of the following periods:—

1. From the flight of Moses into Midian to the first giving of the law on Sinai.
2. During the life of Samuel.
3. From the death of Solomon to that of Ahab.

SECTION II.—Give a short account of the book—

1. Of Ruth,
2. Of Esther,
3. Or of Daniel.

SECTION III.—1. Mention the different kinds of miracl wrought by our Lord. Which of them occurred at or near Jerusalem?

2. Enumerate the parables of our Lord; and (avoiding fanciful interpretation) give the obvious lesson conveyed in any three of them.

3. Cite the prophecies of our Saviour which have been fulfilled.

SECTION IV.—Complete and explain one of the following texts, stating where it occurs:—

1. Think not that I am come to destroy the law, &c.
2. Make to yourselves friends of the mammon of unrighteousness, &c.
3. But I say unto you, " Whosoever is angry," &c.

SECTION V.—1. Enumerate the appearances of our Lord after his resurrection.

2. Narrate and explain the cleansing of the Temple. What may be a probable reason of the little immediate opposition which it met with?

3. Narrate the order of events on the five days preceding the crucifixion.

SECTION VI.—1. Give a short account of the life and character of St. John the Evangelist, and state wherein his gospel differs from the others.

2. Explain the occasion and circumstances under which St. Paul's celebrated speech before Agrippa was delivered.

3. Give a short analysis of the Epistle to the Ephesians, and account for the particular character of some of the similitudes employed in it.

SCHOOL MANAGEMENT.

SECTION I.—1. Describe the general character, condition and mode of employment of the labouring poor amongst whom your school is situated. By what means would you be most likely to secure the co-operation of the parents in the education of their children?

2. Draw up a time-table suitable for a town or country school, where in the former there is an average attendance of 100 children, and, in the latter (a mixed one), 90.

3. Draw a ground-plan of a school for 100 children, showing distinctly the position you consider best for the windows, benches, desks, and class-room. Give your reasons.

SECTION II.—1. What is meant in reference to school management by the terms—organization, discipline, method.

2. Show in what way a deficiency in each of the foregoing particulars severally affects the welfare of a school.

3. Describe fully the methods you adopt in teaching reading, arithmetic, and grammar.

SECTION III.—What do you understand by " notes of a lesson;" write the notes of a lesson on one of the following subjects:—

Light,
Snow,
Coarse Language.

SECTION IV.—1. In what way does the study of music and drawing form an important part of national education?

2. What are the peculiar dangers, moral and physical, to which the profession of a teacher is liable? Show how each may be guarded against.

3. Write a short essay on the practical importance of command of temper in teachers.

MECHANICS AND PHYSICS.

SECTION I.—1. *State* the law of equilibrium on a straight lever of the first kind, and *prove* that, if two weights balance one another when the lever is horizontal, they will do so in every position of the lever.

2. Three bodies, weighing respectively 1 lb., 3 lbs., and 5 lbs., being placed in a straight line, so that the second is one foot beyond the first, and the third two feet beyond the second; find their centre of gravity.

3. Prove that if two forces acting at the same point be represented in magnitude and direction by two adjacent sides of a parallelogram, their resultant will be represented in magnitude and direction by that diagonal of the parallelogram which passes through the point of intersection of the two sides.

SECTION II.—1. If a heavy body fall 40 feet in vacuo from rest, what speed will it attain, and what time will be occupied in the fall?

2. Determine the horse power of an engine which pumps up 3000 cubic feet of water in an hour from a depth of 40 fathoms, supposing the modulus of the machine to be $\frac{2}{3}$.

3. Show how to estimate the work accumulated in a body moving with a given velocity; and thence determine how far a ball, projected with a velocity of 30 feet per second, would roll over a grass-plot, if the force of friction were equal to one-fifth of the weight of the ball.

SECTION III.—1. Describe the *hydrostatic balance*, and show how to find, by means of it, the specific gravity of a solid body, heavier than water.

2. How is the graduation of a *common thermometer* affected? When the mercury in *Fahrenheit's* thermometer stands at 77, what is its height in the *centigrade* thermometer?

3. Give some account of the nature and properties of *sound*, and thence explain the construction of the *human ear.*

SECTION IV.—1. State the law which regulates the reflection of *light*, and explain the construction and use of the *camera lucida.*

2. Describe the *solar microscope*, and illustrate its action by a diagram.

3. How are *photographic portraits* produced?

SECTION V.—1. Describe a *mariner's compass*, the means by which the *compass-box* is made to retain a horizontal position through all the ship's movements, and the contrivance for preventing the *needle* from *dipping.*

2. Give some account of the origin of *galvanism*, and of its identification with *electricity.* How may a *voltaic pile* be constructed?

3. Describe any contrivance with which you are acquainted for applying *electricity* to move *clock-machinery.*

SECTION VI.—1. Explain the difference between *chemical* and *mechanical* combinations, and illustrate your ideas by reference to the elements which compose air and water.

2. What substances may be considered as *simple combustibles*, and what as *supporters of combustion?* What are the respective functions of these two classes of substances in the process of combustion?

3. Describe the nature and sources of the food of plants, and show how an acquaintance with these things may be rendered useful in practical agriculture.

To Correspondents.

J. B. in our next.

PRICE'S PATENT CANDLE COMPANY.

IMPROVEMENT OF THE OPERATIVE CLASSES.

We return with no slight degree of pleasure to the consideration of this interesting subject, which we dwelt upon at some length in our April number, for the more we examine into the proceedings of the company, the more important, in a moral point of view, do they appear to us; and the lapse of time and the progress of events seem continuously to be furnishing fresh demonstration of their success, and to be leading on the directors and proprietors to increased liberality and earnestness, and wisdom in the perfecting of their beautiful experiment.

Indeed it is scarcely proper to consider the matter an *experiment* any longer,—it is very evident that the proprietors themselves do not consider it so; for we understand that they are now so convinced of its positive success, that after increasing (in December) by several hundreds of pounds their vote of last spring for the annual cost of the moral improvement of the factory, they have lately given to the directors an uncontrolled power in the matter, ***as being a recognised necessary portion of the general factory expenses.***

We have, indeed, come to a hopeful condition, to one which may well fill our hearts with joy and thankfulness, and brilliant expectations for the future, when we find a large manufacturing company, composed of several hundred (*general,* not *culled*) proprietors, possessing several extensive factories in the metropolis, and now erecting like works upon an enormous scale in Lancashire—when such a company has, after mature consideration and long and patient experiment, fully recognised it not only as a privilege and a duty, but as highly conducive to its own fiscal advantage, to make it a part of the regular general expenses of their factories to promote to the utmost the bodily health and comfort, the intellectual advancement, and the moral and religious culture, of all the persons in its employ.

We will briefly recapitulate, for the benefit of our readers, the chief things which have been done for the attainment of these objects, as far as we have been able to gather them from such sources of information as have come within our reach.*

1. There are several schools within the factory premises, or immediately connected with them, adapted to all ages of young persons, both male and female, who are engaged in the company's employ. The hours of the several schools are arranged so as to fit in with the hours of factory work for the various students, and the young persons are transferred from the schools to the workshops, and the workshops to the schools, as the factory work increases or decreases. The schools are made also a kind of nursery for the factory children, to which young persons are admitted for purposes both of *testing* and of *training* before they are taken into the workshops, where otherwise many of them might do mischief to others, or receive injury themselves, besides causing much trouble and loss to their employers. These schools are conducted by well-trained masters and mistresses, with ample remuneration, and every care is taken that they should have a high intellectual character: but the moral and religious training of the students is attended to as the first and paramount duty, the knowledge of God, the formation of high principles of action, and the cultivation of habits of virtue and devotion. The schools appear to be wisely

placed under the immediate control of their several masters and mistresses, which is a more important element of success than many people are apt to imagine; but instead of being merely turned over to them, as *their* business only, and taken no other regard of, they are considered a most important part of the factory system, and it is the recognised duty of the factory chaplains to give to them close daily attention; and the managing directors themselves exercise over them as much watchful superintendence as over any other department.

We stated in our April number that the female schools—and in fact all connected with the *moral* superintendence of the female part of the factory—had been given over to the absolute care of a lady connected with the proprietary: this appears to us at once to be a most happy circumstance, and to afford a fair instance of the "common sense" judgment of the managing directors. We question whether it would be possible to carry out the system effectually without some such arrangement. The evils necessarily attendant upon the employment of females in large factories it can scarcely be possible to neutralise; much less would it be possible to effect the good which we now learn may arise from it, without female superintendence—the quick perception and instinctive wisdom, and, more than all, the gentle, tender sympathy of a self-sacrificing woman's love. Perhaps one of the chief difficulties in carrying out such a system of factory improvement generally would be in the finding of educated, well-disciplined women to undertake such works of love; and we are inclined to think that among the daily increasing number of those whose hearts are bent upon devoting themselves entirely to the service of God and the welfare of their fellows, many might well turn their attention to this subject, and find in it one of the happiest and most useful fields of action. But our limits will not permit us to dwell upon this point, and we must pass our remarks upon two or three of the matters connected with these schools which are most worthy of notice. First, in going over these schools we were particularly struck with the great care which is taken concerning the atmosphere and lighting of the rooms. It must be remarked, that at the Vauxhall factories the company has not at present had the opportunity of erecting buildings specially adapted to their schools: they are buildings which have been erected for other purposes, and some of them are such as required not a little cleverness to fit them in any degree for their present use; yet no trouble or expense seems to be spared to make them light and airy and cheerful; and the atmosphere, when we visited them, was as pure as that of a well-ventilated sitting-room. This is a most important point, not only with respect to the physical health, but also to the intellectual and moral welfare of the students, and it is a matter too frequently neglected. Many a school, and many a noble school too, fails in its intended effect from insufficient attention to ventilation. It is quite impossible that children boxed up in a hot, fetid atmosphere for many hours every day—involuntary cannibals, feeding upon one another, constantly imbibing the exhalations of each other's frames—can make much advancement in humanity, can become otherwise than degraded. The evil will tell in different ways and in different degrees upon different children; but, as a whole, the school will be a failure. The bodily health of the children will suffer—their physical energy and activity will decay—and, on the average, they will be sickly and ill-grown and emaciated. In moral character they will depreciate, and become lazy and slovenly, and obstinate and unamiable, and selfish and deceitful; and even the mere intellectual character of the school will be degraded, for they will become incapable of mental exertion.

The success of the whole experiment has not improbably depended in no slight degree upon the sound judgment of the managing directors in this particular; and their discretion is equally evident in another kindred matter—the making of their school-rooms comfortable, cheerful, happy-looking places, instead of the uninviting, shed-like buildings which they generally are. A wide floor, clean walls, a high roof, large windows, and good ventilation, are not, we are inclined to think, the only things required for a good school-room: there should be no dreariness about it—nothing cheerless or forbidding: appropriate in all its appointments, it should be an inviting, cheerful place, in which the child should feel happy and "at home"—where everything around should be conducive to the cultivation of "taste" and the instinct of beauty. This is a matter too often neglected in schools. How is it possible to teach children cleanliness and neatness and order when the walls of their school-room are hung with ill-arranged, untidy maps and pictures? And what a mighty instrument of civilization and moral culture do we neglect when we forget the influence of the senses, and leave our school-rooms unadorned by tasteful and appropriate decorations. Mr. Wilson and his brother have not been unmindful of this matter; on the contrary, it is evident that the greatest care is taken in this direction, and it is interesting to see how much they have been able to effect with most unpromising materials and opportunities. We are not a little curious to see how widely they will carry out the principle in the new school buildings which the company has authorized them to erect. We are quite sure it will not be neglected, and have much hope that, under such direction, it will be done judiciously; and we augur from it very happy effects upon the students themselves, besides affording an example to others.

And here we cannot deny ourselves the pleasure of narrating an incident which has lately been brought under our notice, as affording some illustration of this subject in connection with a kindred one—the judicious choice of tasteful and appropriate prizes—as well as furnishing an instance of the wide influence for good which such a moral work as that which is now carrying on by this company may exert. In one of the largest metropolitan workhouses, situated in one of the worst districts of London, and very far removed from the company's premises, there was lately appointed a new nurse to one of the infirmary wards; the chaplain, on visiting her, was agreeably surprised to find the walls of her room hung with religious and devotional prints of a superior character. On his expressing his pleasure at the circumstance, she told him that her son was accustomed to bring them to her, of whom she spoke in the highest terms, and said, "He is very fond of such things, and receives them at 'Price's Patent Candle Manufactory,' where he works."

Another point, with respect to the management of the schools, which strikes us as peculiarly worthy of notice, is the judicious system which seems to be pursued with respect to the religious instruction. The managing directors are quite in earnest in the matter. Religious culture is, after all, the great thing which they have in view; but they act as men who well know what they are, and are well acquainted with the materials they have to deal with. It must be remembered that in a large establishment of the kind before us, there will not only be parents and children of all stages of religious ignorance and unbelief, but also persons of all sorts of religious sects and parties. The line which the managing directors have taken appears to be a perfectly open and decided one as respects their own conduct and duty, and one of loving forbearance and tender sympathy with all connected with them. Our limits forbid us to produce extracts upon this interesting point. We proceed to notice in connection with it,

2. The regular appointment of two chaplains, licensed by the bishop, and receiving from the company stipends far above that of an ordinary curate, for the spiritual superintendence of all the workpeople in the Vauxhall factories who are willing to receive their attentions. It is, we believe, the duty of one of these chaplains to give daily attendance to the factory schools, and to the various daily social religious services within the factory walls, and in every way to act, as it were, as its family priest; while the duty of the other is to attend to the services of the chapel, and to visit the members of the factories in sickness, and look after the spiritual interests of their families, each chaplain being responsible for his own department of the work, but both labouring together, and each assisting the other as occasion serves.

The evil to be avoided here is the chaplain becoming too much of a secular teacher—to the occupation of his time, the exhaustion of his physical and mental energy, and the consequent decay of his spiritual health and usefulness; in his sinking of the priestly office in that of an ordinary schoolmaster. This is an evil very common with such active parochial clergymen as happen to be great educationists, and it is one which the spirit of the times has a tendency to force upon any energetic man placed in such a position. We feel sure, from the wisdom they have hitherto displayed, that the present managers of the company's affairs will watchfully guard against it; but we have not hesitated to allude to it, because we think that, without watchfulness, it is an evil which the peculiar circumstances of the case are very likely to bring upon them, and which, if they do fall into it, will greatly mar, if not entirely destroy, the noble work which they have in hand.

3. A large chapel is rented in the neighbourhood of the company's Vauxhall factories; it has been fitted up at considerable expense, for the use of the factory people and their families, and is thronged by them Sunday after Sunday. The galleries are entirely filled by the factory boys, who are taught to chant the services of the Church, and do so heartily and with devotion; the space beneath the galleries is occupied by the girls of the factories; and the centre is occupied by the men whom the company employs, together with their wives and such few strangers as may from time to time find room. The present chapel, though large, is too small for its purpose, and moreover is not very conveniently situated, and, having been a meeting-house, has no great beauty or ecclesiastical propriety; but it is as well fitted and as decent, and is kept with as much neatness and order, as any fashionable chapel in the metropolis; and the new chapel which the company is about to erect for the factory, we may well hope will supply all shortcomings, when we see the spirit and views with which it is commenced.

4. There has been provided and adapted, under the immediate superintendence of the lady who has taken the moral direction of the females of the factory, a house for the reception of such girls and other females in the company's employ as have not parents in the neighbourhood, or otherwise require protection, affording to them the refuge and benefit of a safe, convenient, cheerful, happy "home."

5. The next item in our list shall be described in the words of Mr. J. P. Wilson, in his proposal of it to the directors, in December last. We regard it as furnishing a fair instance of the parental love and watchful sympathy which run through the entire system.

> "We propose to rent a piece of ground near the factory, with grass and trees upon it, and to place a careful person in charge, with a good supply of books, on the summer Sunday afternoons, from two o'clock till five; and to let the boys, and such of the men as choose, come here and sit about in the shade reading. At present this part of the Sunday is a great difficulty with our younger boys; their parents often shut them up in the house, too often close and unhealthy, except at the times for going to the chapel in the morning and evening, and thus give them a gloomy day rather than run the risk of mischief in the streets; for the younger boys will not, as many of the elder ones do, take a good walk clear away from the low part of town in which their homes are; but the parents would be delighted to send them to any place where they would at once be in the open air and out of mischief. We cannot yet say the exact cost of this, but it will not be anything considerable."

We need scarcely add that the proposal was at once adopted.

6. The cricket was noticed at some length in an extract in our former article. Our limits forbid us to go any length into this subject now, but we quite agree with Mr. Wilson in his estimation of its importance. To train the factory lads in fine athletic exercises, and practise them in manly sports, in company with their superiors in station and refinement, and especially with those whose hearty anxiety is to refine and elevate the lads they play with, must, when prudently carried out, have a most beneficial effect. The company, under the advice of the managing directors, rents a large piece of ground as a cricket-field for the boys of the factory, paying all expenses connected with it, and giving prizes for the encouragement of the play. Here it is that the boys spend most of their summer evenings, frequently in company with the managing directors and some of the other factory authorities; and we can easily understand Mr. Wilson's high estimate of the effect which it has upon their health, and physical activity and strength, and also upon their moral civilization.

7. In connexion with the cricket, the *gardens* were incidentally alluded to in our former article, and they seem to be of equal importance. Besides being a healthful occupation, gardening must have a most beneficial effect on the minds of young persons who have for the most part been born and nurtured in the low districts of the metropolis, and who spend their days in factory work, and rest at night in the courts and alleys of London. The study of nature in any form is more or less elevating to the mind of youth; but the watchful, thoughtful, patient spirit of inquiry, the cultivation of the taste both in form and colour, and the habit of neatness and order which it engenders, render the immediate personal care of a flower-garden a very important accessory to the work of education and moral civilization. This has not been lost sight of by Mr. Wilson and his brother directors, under whose recommendation and management the company rents a considerable piece of ground to furnish flower-gardens for the boys in its employ, and encourages and assists them in the cultivation of them.

8. The summer excursion, which was also alluded to in an extract in our former article, is another way in which the company systematically cares for the health and enjoyment of the young persons in its employ, and seeks to enlarge and cultivate their minds, and inspire them with a love of the beauties of nature. The excursion alluded to in our former article was one of 100 boys to the neighbourhood of Guildford, in the year 1850, at

an expense of 28*l*. This was the first and tentative excursion; that in the following year was on a larger scale, and cost 48*l*. It was still tentative and at Mr. Wilson's own charge, and he shall give the account of it himself:—

> "The next excursion, that of last summer, was on a grander scale:—250 started before six o'clock in the morning of Saturday, the 21st June, in a small steamer, from Vauxhall-bridge, to join a larger steamer lower down the river, in which to go to Herne Bay. The number who had seen the sea before was astonishingly small; I do not know exactly what proportion of the whole number, but there was not nearly one in ten who had seen it. The sea is not so perfectly sea at Herne Bay, as the country is country at Guildford; but still it was an exceeding delight to them, and as the wind freshened a little on the way back, they (which was not quite so delightful) felt as well as saw it; and the majority showed that they did so. All the first who felt qualmish were greeted with a general cheer, to console them, but another half-hour made a sad alteration in the proportion of the cheerers to the cheered. The day was as perfect as that of the previous year, being a broiling hot one (between several cold ones both before and after it), and as the water was quite smooth going down, and as the boys so heartily enjoyed the voyage down, and the run on shore, and the bathe there, the half or three-quarters of an hour's sickness coming back did not much matter; but on the contrary would make them understand the sea all the better. On the whole I think this excursion was as completely successful as that of the previous year, both in the delight the boys derived from it, and its effects in opening and benefiting their minds. They will remember it, if only for the complete flaying which many of their faces underwent from the sun, although the motion of the steamer through the air prevented the day feeling one degree too hot. The appearance of their faces the next day in the chapel, compared with what they had been the week before, greatly astonished those who did not know the cause."

This was written of the excursion of 1851, but before the time had come round for that of last year the company had adopted it as part of their factory system, and had voted to Mr. Wilson the reimbursement of the charges of the former occasions. The excursion was made to Farnham, at the special invitation of the Bishop of Winchester, and his lordship entertained 300 factory boys and, we believe, more than 200 factory girls, in the castle and its grounds, with old-fashioned episcopal hospitality.

9. The next thing we have to notice is a recent arrangement of the company, which will affect the health and comfort, and moral welfare, of all who are employed by them, both old and young. It is of so peculiar a character, and so beautifully illustrates the parental manner in which the whole factory family (for we know no other term which will express their connexion) is taken care of, that we feel ourselves compelled to set it before our readers in Mr. Wilson's own words, though we shall have to apologize for the length of the quotation:—

> "We propose that the Saturday half-holiday of the summer should be made a real half-holiday, instead of being, as at present, a mere arrangement of the men themselves, sanctioned by us, to work more on five days of the week, and less on the sixth. The regular tea-time is half-past five o'clock, but in summer, it has always been altered to six for the first five days of the week, to lengthen thus by half an hour the work of each of these days; and the dinner hour for Saturday has been made half-past one, instead of half-past twelve, so as to gain another hour here, and thus to earn the half-holiday of not returning to work after dinner on Saturday. We now propose that the tea-time should remain half-past five in summer as well as in winter, and that the Saturday dinner-time in summer should remain as in winter, and that the Saturday after-dinner time should be given up by the company, the work ceasing, as far as possible, at half-past twelve o'clock.
>
> "We say 'as far as possible,' because in all such arrangements it is quite understood that nothing whatever must stand in the way of the perfect performance of every part of the work. During the month of October, for instance, the factory, while adapting itself to the new state of things caused by such an extra press of business, and while drilling in the new people taken on to assist in doing it, gave up the school-time, much of its

meal-times, and all else that interfered with its one pressing duty of the moment as a Candle Factory—the turning out the largest possible quantity of candles. It did this one duty well, for we sold twenty-four tons for every working day of the month; and there was no fear but that, with proper arrangement, all other duties would presently again find their time and place without checking this first one. Accordingly on the 1st November, the additional workers having become sufficiently practised, we returned to our ordinary hours without any diminution of the increased rate of work gained in October.

"We are sorry to say that the summer half-holiday will not benefit all who will have contributed to the winter success, because many of them are employed only during winter; but even these will be encouraged to endeavour to make to themselves such a character as shall bring their names into the list of those employed permanently. Also, this difference in number between the winter and the summer workers, while it makes the indulgence proposed a less boon for the factory as a whole to receive, makes it a less expensive one for the company to grant.

"The summer piece-workers will not be affected by the letter of the proposed arrangement, but then, many of the best of the winter piece-workers are in the summer time-workers, at whatever we can find for them to do; and if it were understood that the spirit of the arrangement is, that the company wishes to grant an indulgence equal to the summer half-holiday to all those of its permanent servants who have exerted themselves during the winter, we shall have no difficulty in carrying this into effect in all particular cases.

"In some cases, for instance, of those who are piece-workers all the year round, or of those whose work cannot stop at half-past twelve on Saturday afternoon (for there are parts of the work which never can stop without loss to the company between twelve o'clock on Sunday night and twelve o'clock on Saturday night), it would be almost the making of a man or boy, after a year's hard work, to pay him a fortnight's wages (which would be equal to the summer weekly half-holiday), and to let him go for that time to friends in the country, if he has any, or if he has not, then to the seaside. He comes back, especially if a boy, a different creature from what he was when he went away, in point of vigour of body and mind, and fitness for another year's hard work; and, for such hard work as ours is at present, a man or a boy at his best in these respects will not find that he has much vigour to spare.

"Why we speak of this particular form of granting the summer indulgence in particular cases is, that we have already tried it in a small way, and with such results as have made us wish to attempt something more general. We have sometimes seen a valuable man flagging at his work, being evidently in a state in which it was too much for him; and we have, as a matter of pecuniary interest to the company, sent him off for a holiday for a week or two without stopping his wages, and the experiment, considered as an economical speculation by the company, has completely succeeded. This last summer, also, we sent away, at different times, five boys to the country. Three of them, being apprentices, had money of their own, the apprentices having a certain amount of weekly wages paid out, and a small weekly sum placed to their credit in the books, to lie at interest, and not to be touched except in very special cases. To each of these three we paid out 5*l.* of his own money, that he might invest it in good health. The other two boys had no means of their own, and, indeed, had been helped by the sick fund of the factory through long and dangerous fevers. They returned to their work, but it was plain that they were losing strength again daily, instead of gaining it. They would probably, like too many a factory boy before them, on returning to his work pulled down by fever, have continued to get weaker and weaker at it, until compelled to leave it altogether; and here would cease, according to the established trade principle of a fair day's work for a fair day's pay, all connection between their master and them, and he need not, in walking through his factory, let any uncomfortable thoughts be raised in his mind by two new and healthy faces appearing where two sickly faces had been before; and if he wishes to avoid such thoughts he had better ask no questions, for the answer would probably be, that, losing with their work the wages which gave them their only chance of recovering their strength, they sank all the faster after leaving it, so that but few weeks at home were needed to prevent their sickly faces troubling any one more. But the factory sick fund gave our two boys 2*l.* each, and the company as much more, and sent them off to Margate. The two or three weeks' change sent these two and the other three back to their work quite different beings, able to bear anything.

"Upon this proposal of a fortnight's holiday in summer to some of those deprived, by the nature of the work, of the weekly half-holiday, we would remark, in deprecation of our being thought to propose something too much out of the course of common factory management, that all engaged in the counting-house have, as a matter of course, three weeks' holiday in each year, and that we ourselves get holidays as we can, and this without any doubt in our mind that holiday-making is a positive saving of time in the long run, from the greater power of work given by it; and we would state that the result of our observation here, both on such little chance opportunities of observation as those above noticed, and on such others as are afforded us by those of our men who are able to make visits to the country on their own funds, is, that the value of holiday and change, so generally admitted in the case of those who work with their heads, holds good also, although not generally thought to do so, in the case of those whose work is chiefly bodily. In our particular case, indeed, the principle holds more strongly for the body-workers than for the mind-workers, because the former have not even the partial daily change of sleeping in an atmosphere a little more free than that in which their day's work is passed; the situation and air of a London labourer's home being even worse, in general, than those of his factory. We believe that such holiday-makings as are here proposed, whether the weekly or the other, in all cases where the people are already far enough advanced to be out of danger of mis-spending the time so given them, would be one important means of arresting the sad physical degeneration notorious in city working people, and which made a recruiting officer assert that it would be impossible in all Manchester to raise a regiment of dragoons; and if this be so, then our point is proved that holiday-making is as much saving of time to body-workers as to mind-workers.

"It is possible that, for the many cases of boys weakened through sickness so as to need change, and yet without friends in the country, and not themselves such as could well be trusted alone, the best and cheapest way of carrying the plan out will be, that the company should have some place at Margate, or elsewhere, with a trustworthy person in charge of it, to receive and look after them. We mention this now not as a thing upon which we have at all made up our minds, but only to prevent our being suspected of carrying out some wild scheme of our own fancy, if any one should hear of our making the experiment and not be aware of the circumstances under which it is made.

"It is difficult to state the amount of money involved in our different proposals without giving an erroneous impression, for the figures look alarmingly large when viewed in any other light than the light in which they always show themselves to us who are in the midst of the business, and which is the only true one, that of their amount relatively to the extent of the business and to the size of the other figures with which it has to deal; and we beg that no opinion may be formed upon any of them, as to their propriety or otherwise, until what we shall say in the end of this letter on the subject of their absolute and relative amounts shall have been carefully weighed. With this caution, we shall give the money amount of each proposal as nearly as we can, but shall not give any tabulated statement of the whole, because in such a statement the figures, being separated from their explanations, give an altogether false idea; and we deprecate beforehand any such statement being drawn up against us as an objection to our plans. No single figure shall appear in this letter of which we do not prove the propriety as we go along, and that is all that we are concerned about; for if each part be right the whole must be right, and moreover, in such a case, the only possible way of proving the rightness of the whole is to prove that of each part. If, for instance, we were called to account for paying away in any week 800*l.* or 900*l.* of the company's money in wages, we could not prove ourselves right in doing so except by showing, of each one of more than a thousand small separate amounts, that it was a profitable outlay for the company to make: and when we had shown this, any exception taken to their aggregate amount, and any asking for proof of its propriety, would of course be absurd.

"The money amount of our first proposal, that of the extra pay, is about 900*l.* The amount of the second proposal, that of the summer holiday, has no business to appear in money at all. The true statement is this: we are going to pay each one of a certain number of our people wages for 3110 hours in each future year, as we have in each past year; but we are going to make them work in future only 3006 hours for their pay of 3110, and we assert that out of these 3006 hours' work done, in the spirit in which it will be done, we shall get more value than out of 3110 hours in the ordinary spirit; and we would respectfully suggest that this is a matter of which the decision must depend so entirely upon knowledge of the particular circumstances, that we are really the only competent judges upon it. The only way, then, in which we can give a money amount for this second proposal is by saying, that if the abstract question were asked, 'What would be the money difference between 3110 hours and 3006 for the whole of those to whom you propose to give the holiday, supposing the speed and quality of the work to be alike in the two cases?' the answer would be, 'About 1200*l.*' But let the real question be asked, 'What is the difference between 3006 hours of such labour as you will have and 3110 hours ordinary labour?' Our answer would be, 'Some hundred pounds, but we cannot tell how many, in favour of the smaller number, so that we should prefer it to the other at the same price.' If, therefore, this second proposal were made to figure in a tabulated statement of nothing but figures, as involving an outlay of 1200*l.*, this, though true in appearance, would be absolutely false in fact. The circumstance of three-fourths of the work being piece-work in no way affects the argument; for the time-work and wages are the standard to which the piece-work and wages are from time to time readjusted, and every improvement in the power of work generally in the factory necessarily brings cheaper piece-work."

10. We gave, in our former article, some account of a tea-party given to the girls of the factory, at which we had the privilege of being present. Such tea-meetings, or home festivals, given in winter and spring to the factory boys, are a regular part of the system, and are charged to the company's expenditure. They are given not only as a reward and means of enjoyment, but in order also to keep the lads away from more dangerous amusements, and as an instrument of civilization. Mr. Wilson says:—

> "It was on Easter Monday that our first tea-party was held, partly in order to try our powers of attraction against those of Camberwell and Greenwich fairs, both of which are within reach of the factory. Ours were the stronger, both then and on the Whit Monday following."

11. We have, in the next place, to notice a vote by the proprietors for the provision of baths and washing-places within the walls of their factories, for the comfort and health of their workpeople, and especially of the boys in their employ; and, in connexion with this matter, a good and comfortable room for the workmen who desire it to take their meals in, and a good kitchen and cooking apparatus where their meals may be dressed: these two last-stated arrangements having especial reference to the night-work of the Belmont factory, which was found to present peculiar temptations to the men and boys employed in it, from the necessity which existed to many of them of frequenting the eating-houses and beer-shops of the neighbourhood, in order to procure their midnight meals.

12. We have already noticed that, in connexion with the intended new chapel at Vauxhall, rooms are to be provided for the *men* belonging to the factories. These rooms are for the use of an association which has sprung up spontaneously among the men themselves, and which they call "The Mutual Improvement Society." Reference to the printed "Reports" of the company will show its origin, and how sound and healthy is the moral work which was so lovingly begun and carried on by the managing directors, and has since been adopted by the company.

Our concluding quotation will show the result of this movement after eight months' trial, and also show what the company has already done to assist it, for the recommendations of the following extract were all agreed to:—

> "The men's Mutual Improvement Society, which is in no way interested in the educational votes of last March, having now been in existence some length of time, and succeeding so well as to leave no doubt of its permanence and usefulness, we propose to pay to it 100*l.* as the company's subscription for this year. They have found it absolutely necessary, on account of the varying states of progress of the members, to take a house, in order to get several different class-rooms, using the night-light school-room, which we lent to them at night for their first start, only as a reading and lecture room. For this and other things they need more money than their own subscriptions amount to—more, indeed, than they ought to amount to, considering that they have their wives and families to provide for; and if the subscription were made sufficiently high to bring

in the amount necessary for working the society efficiently, many of the best of them would, as a matter of principle, deprive themselves of the pleasure and advantage of continuing to belong to it.

"We propose also 50*l.* for a similar society now setting hard to work in the Battersea factory. The members of this belonged at first to the society here, but the walk of an hour out and an hour home again was found an insuperable obstacle to properly attending it, and has led them, in the increasing importance of the Battersea factory, and increasing number of those employed in it, to set up for themselves; also 25*l.* for a society of the same sort in the Manor-street factory; and 25*l.* for an important class, formed chiefly among the Belmont apprentices, and superintended by the head engineer and the foreman of the carpenters, and which they call the experimental class, but which at present is hard at work making a lot of philosophical apparatus: engineer apprentices, coppersmith, carpenters, and coopers all working in their own time, each at what he is best able to do towards this purpose; so that the money they require is chiefly for material, and each pound given them will become two or three in value of apparatus by their labour put upon it. It is an admirable method (we can say so, because it was devised by the foreman and the boys themselves, without any suggestion from us) of advancing our mechanic apprentices in knowledge and skill, and will also bring into view the particular capabilities of the other boys of the factory allowed to join them, and will thus guide us in the choice of future apprentices. They hope to employ some of the summer half-holidays in visiting different factories to which we may be able to introduce them."

We have not by any means furnished a complete list of the company's acts of wise liberality in the great moral work which it is carrying on. Had our limits permitted, we might have dwelt with advantage, at some length, upon "the savings-bank," "the sick fund" (which is a fund long ago formed among the workpeople themselves in the company's Vauxhall factories, and to which the company has now volunteered to contribute about 200*l.* a year), the system of indoor amusements to young persons of the factories, the encouragement of music, the instruction in various useful trades, the system of prizes and rewards, the encouragement of private reading and study, the large and wise distribution of books, and several other matters. Of these, however, we must, for want of space, omit all further notice; and we must, with still greater regret, delay till a future opportunity the discussion of certain general principles on which, we believe, the success of this noble Christian work has, under the Divine blessing, mainly depended.

ON THE STUDY OF WORDS.

(*Continued from p.* 202.)

THE *fourth lecture is on "The Rise of New Words," and must not detain us long. It is an additional lecture, and our author seems conscious that he has exceeded the needs of his original audience, and sometimes moved in a sphere too remote from that in which their future work would lie. It is, however, well worthy of a careful perusal by readers of more extensive views.

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* Reverting to Mr. Trench's observation, that a people's use of words may afford an insight into their habits of thought and feeling, we may produce, as instances of the commercial nature of those of our own countrymen, the following selection, all of which in their recently-acquired usages point very directly to their place of birth:—

Indorse—from the discount office.
Margin—from the accountant's.
Patent—from the consulting engineers, though with a retrospect to an earlier source.
Antecedent—perhaps from the lowly stirps of our national schools.
Realize—from commercial speculations, or with some, from the myths of Germanism.
Outside—it is difficult to say whence.

To the introduction of Christianity, to its rise and progress, as recorded in ecclesiastical history, to discordant interpretations of its doctrines, many important words, and usages of words, may be easily traced; and, as matter of curiosity at least, the times when, and the occasions wherefore, certain historical and geographical names were first imposed, are suggested as deserving of inquiry.

For instance, when and by whom were the Christians first so called? not by themselves, but by their adversaries (Acts xxvi. 28; 1 Pet. iv. 16). Mr. Trench proceeds to teach us what may be learnt of circumstances closely connected with the progress of the apostolic mission, and of singular influence upon it.

Then again, when, in what stage of our history, and under what predominant authority, did the name of Anglia, or England, supplant that of Britain, by which this island had been known for more than a thousand years? Our author, be it remembered, is lecturing in the episcopal city of Winchester, and the question is calculated to affect the civic feelings of his auditors; for at Winchester, an old chronicler affirms, the change was determined and completed. But the cause, more than any other, which creates additions to the vocabulary of any language, is, when "new moral and spirtual forces begin to work, and to stir society to its central depths." The most illustrious example is that of a revealed religion, "clothed in the languages of Greece and Rome, languages which in their previous form might have sufficed, and did suffice, for heathenism, sensuous and finite as it was, but not for the spiritual and infinite of a New Dispensation."

Mr. Trench prefers the words "idolatry" and "Saviour," as eminent examples of the necessity of stamping a new impression on the currency of Imperial Rome.

The moral and metaphysical philosophy of Greece, its introduction into the vernacular speech of Rome, and the difficulties experienced in its progress, as manifested in the writings of Cicero—the scholastic and mystic theology and metaphysics of the middle ages—presented in their turns fresh requirements, which in course of time were duly satisfied. And within our own memory, we may add, what an inundation of neoteric revivals or inventions has been poured in upon us to attend the discoveries of modern science, and to add to the subtle and fickle nomenclature of the learned and abstruse inquisitors into the perplexed and perplexing domain of mental philosophy. But we can accompany Mr. Trench no further in this very admirable addition to the course delivered at the Diocesan School at Winchester.

The fifth lecture, "On the Distinction of Words," brings us back to a branch of the discussion of more general interest, and importance too, to the audience for which they were intended. It is to the subject of Synonyms and their distinction, with the advantages to be derived from the study of them, that this lecture is devoted. By synonyms is here meant, of course, not words, as the name imports, of precisely the same meaning, but "words of like significance in the main, but with a certain unlikeness as well," otherwise, indeed, there could be no distinction to study. To discriminate the minute shades between likeness and unlikeness, and to preserve the exact point of sameness, is a task that has been frequently attempted, but never yet, we may venture to say, with complete and unequivocal effect.

Mr. Trench, we are glad to observe, differs from Dr. Whately on the essential question of the value of etymology in researches into the *meaning* of words;—the former claiming and the latter disclaiming its assistance; and a little book, with an "editor's preface," by the Archbishop of Dublin, entitled "A Selection of English Synonyms," has been recently published, in the composition of which, we presume, the anonymous author has relied on present usage, and present usage alone, as a just and sufficient ground of distinctive explanation. But Dr. Whately, in his "Logic," has rather embarrassed us by exhibiting, to our apprehension, a manifest inconsistency in practice with his theoretical principle. We hesitated, and asked ourselves, Can this be? can this have befallen so sagacious a mind as that of Dr. Whately? We will put it in the power of our readers to judge for themselves.

"It is worth observing," he says, "as a striking instance of the little reliance to be placed on etymology as a guide to the *meaning* of a word" (*i. e.* our present usage*); "that hypostasis, substantia, and understanding, so widely different in their sense" (*i. e.* in their usage), "correspond in their etymology."—*Logic*, p. 215, n. 25.

And this he urges, after having in the text resorted to the etymology of *hypostasis* to account for the adoption of that word by the Greek theologians, and after having produced the etymological, *i. e.* the intrinsic, meaning of the word, as affording a sufficient reason for their otherwise unaccountable adopted application of it. "It" (the word *hypostasis*, Dr. Whately informs us) "seems calculated to express 'that which stands under' (i. e. *the subject of attributes*)."

Undoubtedly it does, and as undoubtedly justifies the appropriation of it to the especial necessities of those learned men. And we are sadly mistaken in our notions if this same etymological meaning will not as satisfactorily account for the "different senses" in which we use the other two—substance and understanding. SUBSTANCE is "that which stands under (*i. e.* the subject of qualities; the qualities of matter or spirit)." UNDERSTANDING, "that which stands under; *i. e.*" (to continue Dr. Whately's expression) "the subject of thoughts, ideas; that *on* which they are impressed." And this will not inaptly conform with the modern language of mental philosophy, that the SUBJECT is the *knowing*, and the OBJECT is the KNOWN.†

This reference to etymology affords a guiding star to Mr. Trench through some pages of his book: "You will observe," he writes, "that in most of the words which I have adduced I have sought to refer their usage to their etymologies, to follow the guidance of these, and by the same aid to trace the lines of demarcation which divide them" (pp. 162-3). "Though words," he continues, "often ride very slackly at anchor on their etymologies, may be borne hither and thither by the shifting tides and currents of usage, yet are they for the most part still holden by them. Very few have broken away, and drifted from their moorings."

As a specimen of the excellent use which Mr. Trench has made of these just conceptions, we will produce his acute examination of the two words, "instruction and education," words at this time of deep and general interest;—as the thoughts of all who *do* think are directed to it as one of the grand topics of the day—the extension and improvement of the national education. No other could have been presented to us more appropriate and welcome to the pages of this journal.

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* This is all that the selection has in view.

† Morell, "Elements of Psychology," introd. p. 2; and see ante, p. 199, Tooke's assertion.

> "There is no such fruitful source of confusion and mischief as this—two words are tacitly assumed as equivalent, and therefore exchangeable, and then that which may be assumed, and with truth, of one is transferred to the other, of which it is not true. Thus, for instance, it often is with 'instruction' and 'education.'
>
> "Cannot we 'instruct' a child? it is asked; cannot we teach it geography, or arithmetic, or grammar, quite independently of the Catechism, or even of the Scriptures?
>
> "No doubt you may; but can you 'educate' without bringing moral and spiritual forces to bear upon the mind and affections of the child? And you must not be permitted to transfer the admissions which we freely make in regard of 'instruction,' as though they also held good in respect of 'education.' For what is 'education?' Is it a furnishing of a man from without with knowledge, and facts, and information; or is it a drawing forth from within, and a training of the spirit of the true humanity which is latent within him? Is the process of education the filling of the child's mind, as a cistern is filled with waters brought in buckets from some other source, or the opening up of its own fountains?
>
> "Now, if we give any heed to the word 'education,' and to the voice which speaks in the word, we shall not long be in doubt.
>
> "Education must *educe*, being from 'educare,' which is but another form of 'educere,' and that is 'to draw out,' and not 'to put in.' 'To draw out' what is in the child, the immortal spirit which is there, this is the end of education; and so the word declares. The putting in is indeed most needful; that is, the child must be instructed as well as educated; and the word 'instruction' just means furnishing; but not instructed instead of educated. He must first have powers awakened in him, measures of spiritual value given him, and then he will know how to deal with the facts of this outward world; then instruction in these will profit him, but not without the higher training, still less as a substitute for it" (pp. 171 *et seq.*).*

The sixth and last lecture is, "On the Schoolmaster's Use of Words," in which our author assumes the office of applying, and suggesting some ways for the intended teachers in training schools to apply, what he has spoken to practical ends; he explains to them the great benefits they will derive from their being made acquainted with the rudiments of the Latin tongue, as an important help in acquiring a fuller knowledge of their own; and he very emphatically denounces the attempt to introduce the scheme of phonetic spelling (a scheme which we hope and believe has already perished through sheer inanition).

Schemes of this kind (as old as the age of the Emperor Augustus) have been started at different periods of our own literary history, and have been allowed successively to die a natural death. There had been some struggling to establish themselves in the time of Bacon, who characterises this so called reformation, "that writing should be consonant to speaking," as a branch of "unprofitable subtlety," and especially urges that "the derivation of words, especially those from foreign languages, are utterly defaced and extinguished." Mr. Trench has other reasons against this revolutionary innovation, which he urges with considerable force.

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* JOHNSON does not observe this distinction; it is not his custom. He writes:—

To INSTRUCT, *v. a.* To teach; to form by precept; to inform authoritatively; *to educate;* to institute; to direct.

To EDUCATE, *v. a.* To breed; to bring up; to *instruct* youth.

And WEBSTER, among much that is better, writes, that to *educate* is to *instruct;* and to *instruct* is to *educate.* RICHARDSON is in unison with Mr. Trench.

To INSTRUCT, *v.* To provide or furnish (*sc.* with knowledge or learning); to teach, to guide, to direct.

To EDUCE, *v.* } To EDUCE, to lead or draw forth;—*To educate* (*met.*).
EDUCATE, *v.* } To lead or draw forth; to train or exercise (*sc.*) the powers of the mind, the passions, affections, dispositions, manners.

Our author then proceeds to enlarge "On the Families of Words, and on their unsuspected Relationships," and he places himself on the broadest and safest foundation for securing success in the pursuit of his inquiries into this attractive portion of his course, by a distinct recognition of the principle (the non-recognition of which he declares to be *the* great error of Johnson's Dictionary), "that a word has but one meaning, and that all *the others*, however widely they may diverge from one another, and seem to recede from this one, may yet be affiliated upon it, may be brought to the one central meaning, which grasps and knits them all together" (p. 187).

This is the great principle insisted on, and so elaborately illustrated, in "The Diversions of Purley" (a work from which Mr. Trench largely borrows in his enumeration of unexpected relationships); but the author of that work, so admirably characterised by Lord Brougham, limits the word *meaning* to the intrinsic or etymological meaning, and calls the "all others" of Mr. Trench—*applications;* and which applications should never be admitted unless the cause for so doing be apparent in their use. Thus to adopt Mr. Trench's instance of the different *meanings* of the word "Ecstasy:" Tooke would maintain that the word *meant* the same, whether applied to "madness or delight;" that the application only differed, though the cause of it was the same: the difference here depending on that which was "ecstasied"—in the one case, the senses; in the other, the feelings—of pleasure, of joy—beyond their usual bounds. And this distinction of terms is far the more definite of the two.*

And now we will conclude these our lucubrations "On the Study of Words" by begging the attention of our readers to some rather conflicting usages of a word, received by us from the Latin: the adjective "Natural."

In Greece and Rome, classical Rome, and in the Institutes of Imperial Rome, a *natural* child or parent was distinguished from an *adopted* one. Our customs have not required us to preserve this distinction, and it has not been preserved,—unless, unwittingly, by the Surrogates in our Ecclesiastical Courts.

In the Digest: *Natural* children are children born of a woman living in a state of concubinage, and are distinguished, on the one hand, from those born in matrimony; and, on the other, from those born either in adultery or common harlotry. We do not treat a state of concubinage as in the Digest it is treated; and in common speech, as well as common law, every child, born under any other condition than that sanctioned by matrimonial law, is called an illegitimate, a base-born, or *natural* child.

And yet if we present ourselves before a Surrogate within the precincts of Doctors' Commons, when we are undergoing the expensive ceremony of taking out letters of administration, we are required to swear (if of a father's property) that we are the *natural* and *lawful* sons, or (if of a son's) that we are the *natural* and *lawful* father of the deceased. Natural and lawful—natural and illegitimate—seem to stand directly opposed. We say, seem to stand; for we have as yet barely surmised what the ecclesiastical law intends by natural and lawful—clearly not illegitimate and lawful.

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* "Old Bags" was a common name of Lord Chancellor Eldon, but no one imagined that the *meaning* of the words "Old Bags" was Lord Chancellor Eldon.

But Mr. Cobbett has decided that whenever "natural" is the adjective "to issue of the body," it must mean base-born, illegitimate children; and on this decision he has revived, in the form of a scandal, a circumstance which at the time excited many a ribald jest and political sarcasm from those on whom Camden bestowed the name of "*improbi verborum aucupes.*"

It may not, perhaps, be generally known that the ready pen of Mr. Cobbett has left us "A History of the Protestant Reformation in England and Ireland; in a Series of Letters, addressed to all Sensible and Just Englishmen."

We fear that this book is, all and every word of it, among the pet *credenda* of our Roman Catholic countrymen—at least among those who have recently become converts to Rome. And on this account we enter more at large into the matter, and hope to be excused for so doing.

The author boasts that he had himself sold 40,000 copies of this work; that there are two stereotyped editions in America; and that it has been translated into French, Italian, Spanish, and German. We may conclude, then, that the extraordinary calumny which it proclaims against Queen Elizabeth and her ministers—and not only against them, but against the Houses of Parliament and the whole people of this country—has been very widely spread and believed on the dogmatic authority of the writer.

"She" (*i.e.* Queen Elizabeth), he says, "had in the 13th year of her reign assented to an act that was passed, which secured the crown to her 'natural issue,' by which any bastard that she might have by anybody became heir to the throne. This act, which is still on the statute-book (13 Eliz. c. 1, s. 2), is a proof of the most hardened profligacy that ever was witnessed in woman, and it is surprising that such a mark of *apparent* (!) national abjectness and infamy should have been suffered to remain in black and white to this day."*

It is an old saying, that we readily believe what we wish to be true; and Cobbett's detestation of "Betsy, or Good Betsy," as he sometimes facetiously calls her, was so hot that we may imagine him even to have rejoiced in his heart while inditing this enormous charge of hardened profligacy.

It is difficult to account for the error into which so sagacious a man as Cobbett has fallen on any other supposition than this, that his passions overwhelmed his reason—that he was very little short of being carried by the ecstasy of delight into that of insane credulity. We do not charge him, therefore, with a perversion of truth; our charge is that he, an historian of truth, in a spirit of vindictiveness, without inquiry or reflection, eagerly welcomed an incredible falsehood.†

Let us look into the facts of the case, first remarking that Cobbett, it is quite clear, never saw the act to which he refers. It is entitled "An Act whereby certayne Offences be maad Treason," and, by the fifth section, it is enacted that any one, who, during the Queen's life, shall by any book or writing affirm (at any time before the same be by act of parliament of the realm established and affirmed) that *any one particular* person is the right heir and successor to her Majesty, except the same be *the natural issue of her Majesty's body*, shall for the first offence suffer one year's imprisonment, &c. &c. These are, in an abbreviate form, the words of the act, from which it is evident that Cobbett's version is a tissue of misstatements.

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* Letter 10, s. 295.

† Rapin or Hume might have saved him from this disgrace.

The act does not secure the crown to the Queen's natural issue; it does not make it treason to deny such issue to be heir to it. It contemplates the possibility of an act of parliament to establish and affirm some other particular person to be the right heir and successor to her Majesty; and it imposes a punishment, not on those who deny her natural issue to be such right heir and successor, but on those who affirm any particular person to be so.

And now let us see how this act is recorded by the (almost) cotemporary historian, Camden, to have been accepted at the time by the subjects of the Queen:—

> " Incredibile est quos jocos *improbi verborum aucupes* sibi fecerunt ex clausula illa—præter *naturalem* ex ipsius corpore sobolem—cum jurisperiti liberos extra nuptias quæsitos, quos sola natura, non conjugii honestas genuit, *Naturales* dicant; *legitimos* vero ex formula juris Anglici vocent liberos ex corpore *legitime* procreatos. Adeo ut, tunc juvenis, audiverim dictitantes *verbum* illud a Leicestrio in legem ingestum, ut aliquem *ipsius filium* spurium pro reginæ *sobole naturali* Anglis tandem, aliquando obtruderet."—*Camden, Annales, An.* 1571, *p.* 205.

The "*improbi verborum aucupes*" of those days never surmised, whatever any descendant of that race may do, that any spurious issue of the Queen was to be forced upon the nation as heir to the throne; never threw out a suspicion that she was to have any such issue; but that the word *natural* was introduced by Leicester, that he (Leicester) might at some time thereafter obtrude on the people of England some spurious offspring of his own as the natural issue of the Queen; thus, in fact, assuming that *she* would have no such issue, and that he (relying on the strength and prevalency of the rumours afloat prejudicial to the moral character of the Queen) fostered an intention of branding her memory with infamy by pretending that she had.

It is quite evident that Cobbett had never looked into Camden; and we can hardly believe that he had consulted our modern historians. Rapin and Hume merely repeat the story as they found it in the annalist of Elizabeth; Lingard is contented with mentioning the jests; Carte passes even them in silence; and it may give us some idea of the importance attached to the mat the time, that in the report by D'Ewes of the proceedings on this Treason Act in the Commons House of Parliament there is not the slightest allusion to them. And this report, let it not be forgotten, is preserved in the Parliamentary History of William Cobbett.

We conclude—that from whatever source this usage of the word *natural* in conjunction with lawful, as it continues to be used in our Ecclesiastical Courts, is derived, it was introduced into this statute by the ministers of Elizabeth with the same intendment* (very probably to distinguish it from "adopted," certainly not to denote "illegitimate") and has ever been so understood, and will continue to be so understood, unless the "Letters addressed to all Sensible and Just Englishmen" should convince any of those who have withdrawn themselves from this very numerous class of our Protestant countrymen that they ought to put a construction upon it exactly the reverse.

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* Hume, indeed, says "That the usual phrase *lawful* issue, which the parliament thought *indecent* towards the Queen, as if she could be supposed to have any other, was changed into *natural* issue." And thus the jokes arose. What was Hume's authority does not appear.

PAPERS ON PHYSICAL GEOGRAPHY. No. 2.

EARTHQUAKES AND VOLCANOES (*continued from p.* 166).

THE shock imparted to the ground during an earthquake is most commonly either horizontal or vertical; in the former case the phenomenon consisting of an undulating, wave-like movement, and in the latter of an upheaval (or subsidence) of the land. The vertical shock of course affects the relative levels of adjacent objects, and produces the most striking and permanent changes in the natural aspect of the regions where it is experienced. But the undulatory movement is accompanied by the most serious consequences to man, since it at once shakes the foundations of the strongest edifices, and overthrows, in the space of a few seconds, the accumulated labours of generations. Whole tracts of lands, with their villages or cities, may be elevated or depressed with comparatively little injury to life; but nothing can withstand the force of a motion which rocks even the solid strata of the earth itself. The most solidly constructed buildings are not proof against it, any more than the weakest. Indeed, it has in many cases been observed that those erections which consist of the strongest masonry have suffered more from the effects of a powerful earthquake than buildings of slighter structure. The cracking of walls, the falling-in of roofs, and the crash of tumbling houses on all sides, burying their inmates beneath the ruins, are among the characteristics of the earthquake in its most violent and frightful form.

There is, however, a third kind of movement sometimes, though much more rarely, exhibited during the earthquake; that, namely, which assumes a rotatory or vorticose direction. The existence of this has been sometimes doubted or denied, but it seems sufficiently proved by results observed in various quarters. Buildings, or portions of buildings, have been partially twisted round during a violent shock; isolated columns, or statues, have been found, after such an occurrence, to front a different quarter from that which they previously did. In some curious instances, while the base has remained unmoved, the particular stones of which an obelisk, or similar work, has consisted have been detached from one another and partly turned round*. It seems difficult, indeed hardly possible, to account for such phenomena as the above, without recognising the agency of electricity. Similarly, during the earthquake of Chili in 1835, vessels previously lying in the harbour alongside of one another were afterwards found with their cables twisted together. Some of the vessels were thrown violently against others, and whirled about as if they had been in the vortex of a whirlpool.

The length of time during which the earthquake shock lasts is brief, rarely exceeding two or three minutes—often not more than a few seconds. The terror which it naturally inspires makes it appear of much longer duration; and in the case of the more violent shocks, even a few moments serve to destroy the work of ages. In the Chilian earthquake of 1835, the great shock which destroyed the city of Concepcion was preceded by several tremulous movements of minor intensity. During the first half minute, many persons remained in their houses; but the convulsive motion of the earth then became so strong, that all rushed into the open streets for safety.

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* See Lyell's "Principles of Geology," Vol. II., p. 211 (5th edition); also Captain Fitzroy's Account of the Chilian Earthquake in 1835 (Journal of Royal Geographical Society, Vol. VI., pp. 321—324).

The horrid motion (writes an eye-witness of the scene) increased; people could hardly stand: buildings waved and tottered; suddenly an awful and overpowering shock caused universal destruction. In *less than six seconds* the city was in ruins*.

In frequent instances the shocks have continued to recur, at intervals of various duration, for lengthened periods—during several weeks, or months, or even years. The frightful catastrophe above referred to was succeeded by considerable shocks, at short intervals. The earth was never quiet for any length of time during either that or the next day, nor, indeed, during the three succeeding days. In the case of the well known Calabrian earthquake of last century (1783-6), the successive shocks extended over a period of nearly four years, during the whole of which time the ground within the area affected was never long free from violent disturbance.

From the region whence the disturbing motion originates the shock is propagated to enormous distances. The Lisbon earthquake (1755) was felt in the northern portion of our own islands, upon the coasts of Barbary (on the opposite side of the Mediterranean), and even upon the other side of the Atlantic Ocean, amongst the islands of the West Indies. Perhaps, in the majority of cases, the slight shocks which are occasionally experienced in our country, or in countries which are similarly removed from the great regions of subterranean disturbing force, may be received by the geologist as evidence of some more powerful convulsion in progress elsewhere, in the same way that the swell of the ocean records to the mariner the strife of elemental warfare, and the triumphs of the storm, in a distant part of the sea. The rate at which the shock travels depends, in part, upon the violence of the originating cause, and partly also, there is reason to think, upon the nature of the rocks it has to traverse. With a view to assist in determining the latter point, some curious experiments were made a few years since in the neighbourhood of Dublin. A distance of a mile was measured on the sands, and a cask of powder buried at one end of the line; this was exploded, and the interval between the transmission of the shock to the other end of the line was found to indicate a rate of motion equivalent to 965 feet per second, as the average of several experiments. Similar experiments were made on granite rocks, through which the shock was found to travel at a rate of 1299 feet per second; and in some cases, where the rock was most homogeneous, at the rate of 1661 feet. The rate of transit hence appears, as was expected, to be slowest in sand, and most rapid in hard and crystalline rocks†. The stoppage of clocks at numerous places, during violent shocks of earthquake, has often afforded the means of determining the rate of motion. In the Lisbon earthquake, the shock travelled to Corunna at the rate of 1994 feet per second; to Cork, at the rate of 5280 feet; and to Santa Cruz (in Barbary) at the rate of 3261 feet. The earthquake which occurred in the province of Cutch, on the western side of Hindostan, in 1819, stopped the clocks in Calcutta (at a direct distance of more than 1200 miles), and showed a rate of 1193 feet per second.

The fissures or openings in the ground, which frequently accompany the more violent shocks, constitute one of the most frightful and destructive phenomena of earthquakes. These chasms remain in some cases permanently open; but in numerous instances the earth opens and again closes suddenly, swallowing up whatever is within reach. Thousands of human beings have thus been engulfed within a subterranean abyss. It has been not unfrequently (though by no means uniformly) observed, that the fissures formed during an earthquake follow some particular direction, assuming, that is, a general parallelism of course. That this is often the case is indeed beyond a doubt, and Sir Charles Lyell quotes from an American writer an interesting circumstance in connection with the fact, in reference to an earthquake experienced within the valley of the Mississippi, in 1811: "The people in the country, although inexperienced in such convulsions, had remarked that the chasms in the earth were in a direction from south-west to north-east; they accordingly felled the tallest trees, and, laying them at right angles to the chasms, stationed themselves upon them. By this invention, when chasms opened more than once under these trees, several persons were prevented from being swallowed up."* Many of the chasms remained visible, in the case of this earthquake, for several subsequent years, even in an alluvial soil. The earth frequently rose in great undulations, and, when these had reached a certain height, the soil burst, and vast volumes of water, sand, and pit coal were discharged as high as the tops of the trees. In other instances, however, numerous fissures within a particular tract have been found to radiate outwards, like the spokes of a wheel, from a common centre, as though the sudden violence of the upheaving force had *torn* open the portions of ground that had been affected.

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* Journal of Royal Geographical Society, Ibid. p. 320.

† Paper by Mr. Mallett, read before the Ipswich Meeting of the British Association. —*Athenæum*, July 19, 1851.

The word "torn" expresses indeed, not unaptly, the appearances often presented by districts in which violent earthquakes have been experienced. The upheaval, or subsidence of land, detaches adjacent masses of rock, sometimes precipitating large portions of them into the lower valleys, or hurling them to considerable distances. Land-slips are of frequent occurrence during such convulsions; and in some cases (as during the Calabrian earthquake) large tracts of land, with corn fields, olive plantations, vineyards, orchards, and even dwellings, have been thus put in motion, and carried to considerable distances, from the higher to the lower grounds. The fall of large masses of rock frequently dams up the courses of rivers, compelling their waters to find a fresh outlet. In some instances the waters become suddenly absorbed in the ground, while fresh springs burst out in other places. Temporary lakes are formed, and afterwards suddenly disappear; though it not unfrequently happens that whole tracts of land are permanently submerged.

The permanent elevation of large tracts of land has in no case been more strikingly manifested than by the Chilian earthquake of 1822, in which the shock was felt simultaneously through an extent of twelve hundred miles from north to south, and which affected the levels of the ground over an area exceeding a hundred thousand square miles. The whole country, from the foot of the Andes to the sea, within the part affected, was permanently raised to heights varying from two to six or seven feet above the former levels. Along the coast the rise was generally from two to four feet, and the soundings in the harbours were uniformly diminished to that extent. The entire coast exhibited newly raised beaches, with the beds of shell-fish and various marine substances adhering to the dry rocks.

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* "Principles of Geology," 5th edition, Vol. II., p. 204.

Similar changes occurred during the earthquake of 1835, when the island of Santa Maria (to the south-west of the town of Concepcion) was raised to ten feet above its former level. Another violent earthquake was experienced in the same region in the year 1851.

The adjoining sea is, in nearly all cases, violently affected during an earthquake. The waters first retire a considerable way beyond their usual place, and afterwards return, rolling inland in a huge wave, which rises to a height greatly exceeding the ordinary level. Great damage often ensues to shipping, and the villages or towns near the coast are sometimes wholly washed away. In 1835, upon some parts of the Chilian coast, the waves rose to twenty-five feet above the ordinary level of high water, penetrating into the upper rooms of houses, and leaving pieces of sea-weed hanging to the roofs or to the broken walls*. During the Lisbon earthquake, the sea first retired and laid the bar dry; it then rolled in, rising to fifty feet or more above its ordinary level. The most frightful accompaniment of the catastrophe in this case was the sudden subsidence of the quay, a work newly constructed, and formed of the most solid masonry. An immense concourse of people had fled thither for safety, in order to be beyond the reach of falling houses. Suddenly the whole quay sunk below the waters, with all the dense mass of human beings congregated upon it; nor did a single one of the bodies ever float to the surface, so that there is reason to suppose that the entire mass was swallowed in a chasm which opened and closed again. A depth of a hundred fathoms water remained where the quay had formerly stood. A great wave swept over the coast of Spain during this convulsion, the sea rising at Cadiz to the height of sixty feet.

Subterranean noises frequently precede or accompany the earthquake, and the volcanic eruption also. These sounds in general resemble the rolling of thunder beneath the feet, though the noise is in some cases various, owing, perhaps, in part to the nature of the rock. This phenomenon is, however, by no means of uniform occurrence. Some violent earthquakes are recorded in which no subterranean noises were heard. On the other hand, there are well-known instances of such noises being experienced in volcanic regions, unaccompanied by any perceptible shocks. Humboldt narrates one very striking instance of uninterrupted subterranean noise, continuing for an entire month, in the neighbourhood of the city of Guanaxuato, on the Mexican plateau. The noise began about midnight on the 9th January, 1784. During part of the ensuing period, it seemed to the inhabitants as if heavy clouds lay beneath their feet, from which issued alternate slow rolling sounds and short quick claps of thunder. The noise was limited to a small space, and abated as gradually as it had begun. It was not heard in a basaltic district, at the distance of a few miles. Neither on the surface, nor at the bottom of neighbouring mines, was there the slightest disturbance of the ground†.

An opinion was formerly very generally entertained, to the effect that a peculiar condition of the atmosphere forms a certain forerunner of the earthquake, and indicates in some measure the approaching danger. But this appears to be without foundation, and the idea is now relinquished by those best able to judge of such phenomena. Many recent cases are on record in which neither the barometer nor the thermometer indicated any unusual condition of the air, and in which the magnetic force remained similarly undisturbed, not only before, but during the continuance of the shocks. A lengthened and heavy fall of rain, occurring about three days after a violent shock, appears to have taken place with considerable uniformity in Chili, at whatever season of the year it may have been felt.

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* Journal of Royal Geographical Society, Vol. VI., p. 325.

† "Cosmos," Vol. I., p. 204, *et seq.*

Yet there are not improbably some indications, either atmospheric or in the condition of the ground, by which the superior quickness in the senses of the lower animals enables them to perceive the signs of the approaching earthquake sooner than man ; if, at least, we may trust to a received (and apparently well authenticated) instance of canine sagacity exhibited at Talcahuano, during the Chilian earthquake of 1835, when it is said that all the dogs left the town before the shock which destroyed the buildings was experienced. And the same thing was stated to have been noticed at Concepcion, distant only a few miles, and of which Talcahuano is the port.

We have referred, incidentally, to the loss of life which is the frequent result of the earthquake. The amount of this in particular regions, and within even brief periods, is truly frightful; and could the catalogue of such convulsions throughout the globe be completed, the addition which such phenomena make to the entire sum of human suffering would be found very great. In the Lisbon earthquake, sixty thousand persons are said to have perished within a space of six minutes. During the Calabrian earthquake, again, not fewer than forty thousand persons perished by the direct consequences of the shocks (either buried, that is, beneath the ruins of their dwellings, or swallowed up in openings of the ground), while twenty thousand more are estimated to have died from epidemics, caused either by insufficient nourishment, malaria, or exposure to inclemencies of the weather. Similarly, in the case of the earthquakes which have repeatedly laid in ruins Aleppo and other cities of Syria, as in the various convulsions of a like kind that have been experienced upon the western shores of the New World, we read of sixty, eighty, or even a hundred thousand persons losing their lives in consequence!

Many writers have referred to the peculiar nature of the terror which the earthquake inspires, and to the fact that it is of a kind which no familiarity with the occurrence is able to diminish. With most kinds of natural danger, frequency of exposure gradually blunts the sense of peril, and experience suggests modes of conduct to be adopted in the way of precaution or defence ; but no ordinary means of such a kind are available in the case of a natural convulsion which shakes even the solid ground itself—that "terra firma" which is the very embodiment of earthly solidity and strength. The moral sense, as well as the physical, is affected ; and, with the vast majority of persons, a feeling of utter helplessness, a complete prostration of faculties, ensues. They who remain within their houses during such a convulsion are liable to be buried beneath their ruins, and, in escaping into the open country, there awaits them the danger of being swallowed up within some yawning chasm, freshly opening beneath their feet!

We reserve for a concluding paper some remarks on eruptions, and a few of the minor forms of volcanic phenomena. W. H.

ON THE MANAGEMENT OF CHILDREN, WITH REFERENCE TO THEIR MORAL AND INTELLECTUAL CULTURE.

Perhaps there never was a period when the subject of education occupied more of the public mind, or was so deeply considered by parents or those having the care of the young, as the present. The man of birth has long ago discovered that his heir, to "maintain his position in society," must have something beyond the knowledge necessary to stock a well-appointed kennel, or to secure good blood in his stables; the man of fortune has found that his guineas shine with increased lustre when educated fingers count them; and the toiling artisan finds that he is of more use to his employer, and on better terms with himself, when, under the influence of education, he ceases to be a mere machine and becomes a thinking being.

But it is not so much the intention of these remarks to deal with education in the abstract, or in the light of an acquirement, as to treat of the preparation necessary for it. We do not intend to advise the planting of the tree or the sowing of the crop, but rather to examine the unbroken ground, to ascertain how it should be treated, what kind of tillage it requires, and what species of produce it is most fitted to yield. Our subject will not commence with Locke's "block of marble," which requires the chisel of education and the smooth finish of refinement to make it a beautiful and elaborate statue; but rather with the soft and impressionable clay, as ready to be moulded by the hand of the rude and uncultivated, as to be modelled by the practised manipulation of the "artist."

It would be of great assistance to us, in the commencement of this inquiry, to be enabled to draw a definite and lucid distinction between instinct and reason; to show where the one ceases to exhibit its influence, and where the other commences to exert its prerogative. The attempt has often been made, and too frequently has resulted in the adoption of speculative theories and imaginary conclusions; many of them doubtful as matters of argument, and questionable as regards their morality. Not that these attempts are to be despised, far from it: as with the two sons mentioned by Æsop, who dug in their father's vineyard seeking sudden wealth, but, disappointed in their unreasonable hopes, found only the first step towards them in an increased produce, the result of their own industry; so it is in the legitimate struggle to attain the highest gifts in the treasury of knowledge. We may not succeed in our high ambition: "hills upon hills and Alps on Alps may rise;" the imperfections of our nature, the distractions of the material world, may all combine to mar our efforts, and we may not gain the gem of truth we have so ardently sought; but still, if we are only taught to know our own ignorance, and to feel the immense and eternal distance between the works and manifestations of the Infinite and the feeble powers of the finite, we have gained one bright ray of truth, and have in our own minds realised one of the foundations of all true and useful philosophy. No doubt, in the lower animals, over whom man is given the dominion, instinct supplies the place of reason, and appears in many instances to assume its prerogative. We speak of the "sagacity and fidelity" of the dog, the "imitative powers" of the monkey, and the "domesticated habits" of the cat; but we do not know how these various manifestations are formed, nor can we explain them unless we elevate instinct in many instances to the level of reason. The most satisfactory definition of the distinction between instinct and reason we have yet met with is the one given by Dr. Mason Good, in his essay on this subject.

He says, "Instinct is the operation of the principle of *organized life* by the exercise of certain *natural powers* directed to the present or future good of the individual, while reason is the operation of the same principle of *intellectual life* by the exercise of certain *acquired powers* directed to the same object." It appears as though the Almighty, in his wise and wondrous dispensations, especially protects the exercise of the instinctive feelings of the lower orders of beings. They sow not, and yet they each find their proper and peculiar sustenance, suited to the climate, the productions, and the localities in which they are placed. They traverse the pathless regions of air and water with a precision to which man can seldom attain, and their instinctive perceptions rarely, if ever, fail in the end to which they are directed. But man, in the possession of intellect and reason, formed in the image of his Maker, containing within himself an immaterial part, which when his body decays shall return to the God who gave it: man thus constituted, endowed with intelligence, and superior to all other created beings, with the power to do right, may do wrong. It has been truly stated, that "with the talents of an angel a man may be a fool."

"Whether with reason or with instinct bless'd,
Thus all enjoy the power which suits them best;
To bliss alike by that direction tend,
And find the means proportion'd to the end.
Say, where full instinct is th' unerring guide,
What pope or council can they need beside.
Reason, however able, cool at best,
Cares not for service, or but serves when press'd;
Stays till we call, and then not often near;
But honest instinct comes a volunteer,
Sure ne'er to overshoot, but just to hit,
While oft too short or wide is human wit;
Sure by quick nature happiness to gain,
Which human reason labours for in vain.
This too serves always—reason never long;
One must go right—the other may go wrong.
See then the acting and comparing powers,
One in their nature which are two in ours;
And reason raise o'er instinct as you can,
In this 'tis God directs—in that 'tis man."—POPE.

As we cannot, then, make a clear and distinct separation between instinct and reason, we must be content to take the laws of nature and the faculties of the mind as we find them, as parts of a grand and perfect whole, all arising from and being a part of one great First Cause. "One common and beneficent design, one uniform code of laws—equally simple and majestic, equally local and comprehensive—pervades, informs, unites, and consummates the whole. The effect, then, being one, the mighty Cause that produced it must be one also—an eternal and infinite unity—the radiating fountain of all possible perfections—ever active, but ever at rest—ever present, though never seen—immaterial, incorporeal, ineffable; but the source of all matter, of all mind, of all existences and all modes of existence. Whatever we see is God—all nature is His awful temple—all sciences the porticoes that open to it; and the chief duty of philosophy is to conduct us to His altar, to render all our attainments, which are the bounteous afflations of His Spirit, subservient to His glory, and to engrave on the tablets of our hearts this great accordant motto of all natural and all revealed religion, of Athens and of Antioch, of Aratus and of St. Paul, 'In Him we live, and move, and have our being.'" *

The study of the infant mind, considered only as a part of the philosophy and history of man, without any connection with the duties and responsibilities it imposes upon those who are the natural or appointed guardians of the young, is a subject full of interest, and fertile in truths of the highest practical value and importance. There is an infancy of mind as well as of body; a state of feebleness and pliability; and bad moral and intellectual management is just as likely to lead to a distorted and ill-formed mind as careless nursing is to a decrepit and disproportioned physical formation. At birth the brain is delicately and, with reference to its functions, imperfectly constituted. The organs, through the agency of which it holds converse with the external world, are not yet fitted to assume their functions, and the only manifestations of the existence of any mental development are the sensations of bodily pain and the desire for food. Sleep, the opposite of all mental or physical exertion, occupies nearly the whole time.

After a short period—perhaps at the expiration of a fortnight or three weeks—we observe that the infant "follows the light," or appears to be affected by various tones of voice, and thus gradually the various senses come into operation. But still, though the child appears to see an object, it neither attempts to avoid nor possess it; and the senses of hearing, taste, and touch are so imperfect, that we must consider them rather as vague impressions than as distinct and perfect perceptions. By-and-by further changes take place: the first dawning of reason shows itself; in addition to the perception of pain there is the enjoyment of pleasure; a beam of intelligence shows itself in the artless smile, and the mother acknowledges the sign of recognition; she observes the amusing astonishment and the open laughing eye when any striking object is presented to its notice, and she understands the sound elicited when any pleasing impression strikes the ear.

Even at the early age of six weeks, when the infant is almost an entire stranger to the world, it still seems to be accessible to the influence of human expression. The rudiments of mind are progressing, and there appears to be an intuitive perception of the feelings of those about it, although no material object appears to possess any attraction; yet sympathy, or the impulse of a feeling in its own imperfectly-formed mind, corresponding to the same kind of feeling in the mind of another, is already developed. A smiling air, or a caressing tone of voice, is answered by a smile on his lips and an increased lustre in his eye; pleasing emotions animate the little being, and we who observe their expression are delighted in turn. Now, who has told the infant that a certain expression of feature and tone of voice indicate an affectionate and tender interest for him? How could that puny being, to whom the appearance of its own face is unknown, imitate the expression of another, unless a corresponding feeling in his own mind, a portion of the same intelligence, was called into exercise to enable him to assume the same expression? One, who perhaps has never seen the infant before, shall go to his cradle; perhaps she disturbs him or subjects him to some unpleasant movement, but she speaks soothingly and smiles kindly the while—and what is the result? The unpleasant movement is

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* Mason Good, M.D., "Essay on Instinct," vol. ii. p. 124. 1838. London.

forgotten, its impression soon ceases to exist, he feels he is loved; she has touched that chord of sympathy whose vibrations in his helpless state are a pleasing harmony to him, and he loves in return. But supposing, on the other hand, this stranger had been one of uncouth manner, had spoken in a harsh unfeeling tone of voice, or replied to his signs of discomfort by a cross expression or impatient gesture, then a cry of distress and fear, and an alarmed and anxious expression of countenance, would have been the consequence. Now all these expressions of pain or pleasure, love or aversion, are all mental manifestations; they are feelings to be cultivated for good or evil, and on the manner in which they are treated, and the objects upon which they are exercised, much of the future happiness or misery, and much of the stamp of character to be displayed in after years depends.

Many parents are accustomed to look upon education and scholastic discipline as the same things, and they either will not or cannot understand the great and important distinction between them. It is from this error that much of the disappointment of parents, and a great deal of the undeserved censure cast on public schools arises. Pharaoh was not a more unreasonable taskmaster, when he expected bricks to be made without furnishing the necessary materials, than are some parents when they send their children to school. A boy indulged from infancy in every luxury, every whim and caprice immediately gratified, taught to look upon all who minister to his wants as an inferior class of beings, his mind directed only to one object, the gratification of his own desires and appetites, and whose moral powers, when in their earliest and most pliable state, have either been allowed to develop themselves without cultivation, or else have only been tutored to imitate the indolent and selfish manners of those about him, is sent to some establishment to commence his education. Now commences a course of discipline disgusting to himself and painful to those about him. He soon " votes his lessons a bore," and considers his tutors a set of " petty tyrants." He may have natural abilities of no common order, but his enervated moral powers disfigure them; and his parents, disappointed in their hopes, discover when too late that they have been wanting in the discharge of their duties to him. Education in reality commences almost with the birth of the child; its senses soon develop themselves, then it observes objects presented to those senses, and eventually experiences feelings of pleasure or pain from this observation. Now whatever interests the feelings, or attracts the observation of a child, necessarily modifies its mental state, or, in other words, becomes a means of education. Impressions received through the medium of the external senses soon become ideas, although those impressions are at first simple, and in some degree indefinite. First, the perception of the existence of an object is conveyed to the brain by the agency of the sense peculiarly adapted to distinguish that object; then a consciousness or recognition of the influence of that perception is imparted to the mind by a process which we cannot understand or explain, and, as the result, that which was a perception now becomes an *idea*. Then the continued perception of any object, or the repeated impression of an idea, develops another faculty of the mind—*attention;* and attention thus manifested may be considered as the contemplation or regard of one impression, which, for the time being, excludes all others. This faculty of the mind is most strongly displayed on the perceptions derived through the organs of vision, and next in intensity on those conveyed by the sense of hearing. Attention then being developed, by the ripening of that which was a perception, into a distinct and perfect idea, another important intellectual power is brought into existence —*memory*, or that faculty of the mind which retains the idea of the impression of an object after that object is removed: and as those recollections are always retained longest which have most forcibly or frequently engaged the attention, we ought to cultivate this faculty in the infant, not so much with regard to its rapid and extensive development as to its utility, and the effects it will exercise in future life. The objects presented to the mind during infancy, the manifestations of the feelings exhibited in its presence, the manners of those daily in attendance upon it, should be of a nature calculated to elevate the moral faculties, and to exercise and mature those feelings which will best conduce to its future happiness and well-being. Let us not deceive ourselves, but ever bear in mind that what we desire our children to become we must endeavour to be before them. If we wish them to grow up kind, gentle, affectionate, upright, and true, we must habitually exhibit the same qualities as regulating principles in our own conduct, because these qualities act as so many stimuli to their respective faculties in the child. If we cannot restrain our own passions, but at one time overwhelm the young with kindness, and at another surprise and confound them by our caprice and deceit, we may with as much reason expect to gather grapes from thistles or figs from thorns as to develop moral purity and simplicity of character in them. It is vain to argue, that because the infant intellect is feeble it cannot detect the inconsistencies which we practise. The feelings and reasoning faculties of the mind being perfectly distinct from each other, may and sometimes do act independently, and the feelings at once condemn, although the judgment may be unable to assign a reason for so doing. Here is another of the many admirable proofs which we meet with in the animal economy of the harmony and beauty which pervades all the works of God, and which renders it impossible to pursue a right course without also doing collateral good, or to pursue a wrong course without producing collateral evil. If the mother, for example, controls her own temper for the sake of her child, and endeavours systematically to seek the guidance of her higher and purer feelings in her general conduct, the good which results is not limited to the consequent improvement of her child; she herself becomes healthier and happier, and every day adds to the pleasure of success. If the mother, on the other hand, gives way to fits of passion, selfishness, caprice, and injustice, the evil is by no means limited to the suffering which she brings upon herself: her child also suffers, both in disposition and happiness; and while the mother secures in the one case the love and regard of all who come into communication with her, she rouses in the other only their fear and dislike.

The remarkable influence which the mother exerts in modifying the disposition and forming the character of the child has long been observed; but it has attracted attention chiefly in the instances of intellectual superiority. Men of genius are generally descended from and brought up by mothers distinguished for high mental endowments. In these cases the original organization and mental constitution inherited from the parent are no doubt chiefly influential in the production of genius. But many facts concur to show that the fostering care of the mother, in promoting the development of the understanding, also contributes powerfully to the future excellence of the child; and there is reason to believe that the predominance of the mother's influence upon the constitution of the offspring, in such cases, is partly to be ascribed to the care of the child devolving much more exclusively upon her than upon the father during the earliest and most impressionable part of its existence.

We have seen how, from simple impressions made on the organs of sense, one important intellectual faculty after the other becomes developed, and how the mind increases in its manifestations and offices as the senses become more perfect and the body increases in stature and strength. The mind as yet does not see, through a medium of its own, the senses of right and wrong; and the distinctions between good and evil are only so far felt as to be directed to the present comfort and well-being of the infant itself.

The education fitted for this period consists in supplying proper objects to fix the attention—the instillation of correct ideas, the judicious exercise of the dawning powers of memory, and the presentation of simple examples for imitation; so that when reason becomes more developed, and more perfect tuition is commenced, there shall not be a rough stony ground overrun with briars and thorns to cultivate, but rather a well-tilled and open soil, ready "to bring forth its fruit in due season." It must be remembered that, in the mental culture of children of tender years, we cannot derive any assistance from the exercise of their judgment; this is a faculty of the mind dependant on the proper development of the intellectual and moral powers; and therefore, if we wish our children in after years to be remarkable for soundness of judgment and consequent rectitude of conduct, we must commence our efforts for the attainment of these valuable acquisitions with the earliest dawn of reason, by endeavouring to improve the moral faculties, and by directing the first steps of education in proper and useful paths. Another important principle in the moral and intellectual management of infancy must never be forgotten, for it is formed on natural laws which are fixed and immutable; namely, to give due exercise to all the faculties, and not to cultivate some to excess while others are allowed to languish and become weakened by inactivity.

During infancy, those feelings which supply the place of reason and judgment are easily acted upon, and readily directed in any given course; but if children are frequently perplexed by the contrast between the precepts and conduct of those about them (and they soon begin to perceive the difference), then that authority which would have been a guiding principle for them is lost, and those who, had they controlled their own passions, and observed that each moral faculty of the infant mind is developed by the stimulus or example of a similar manifestation in themselves, soon lose their legitimate influence, and thus lay the foundation for stubbornness of will and waywardness of temper. If as much attention were bestowed upon the cultivation of the moral feelings as upon those of a love of novelty, the power of imitation, and a sense of superiority, with its concomitants, vanity and self-esteem, this world would soon wear a different aspect, and there would be more "peace and good-will among men."

W. P.

(*To be continued.*)

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ınspectors, who is also quoted by the Dean
e Society of Arts, as making the following ob-
ing the parents what sort of education they would
the farm labourer would like his boy to plough a
the potter asks for drawing-schools; the shopkeeper for
in short, they all want that kind of instruction which will
in their several callings. And are they unreasonable in this?
quite sure that we should continue to give eight or ten years to the
of Latin or Greek, if it were not the recognised avenue to the learned
professions! And so it is with the parents among the operative classes—
those to whom they look as the future employers of their children want
good workmen, and therefore the father values no education for his son,
which does not, as he thinks, tend to make him a good workman." The
same inspector states it as his opinion that most parents are able to pay for
their children, and that the prevalence of the opinion of their being unable
is owing to a misconception of their real meaning when they say they
cannot afford it, and to ignorance of the large sums actually paid by the
poor to private adventure schools. When they say they cannot afford
it, they mean they cannot afford to lose the time of their children
when able to work. Certainly they can hardly be supposed to stand
in need of funds, however greatly they may need self-denial and moderation, if there be any truth in what has been said by the late Mr. Porter in his paper on the self-imposed taxation of the working classes, and quoted from him by the Dean of Hereford and other writers. According to this authority, among the working classes so very large a portion of the earnings of the male head of the family is devoted by him to his personal and sensual gratifications, that it has been computed that among those who earn from 10*s*. to 15*s*. weekly, at least one-half is spent by the man upon objects in which the other members of the family have no share. Among artisans earning from 20*s*. to 30*s*. weekly, it is said that at least one-third of the amount is in many cases thus selfishly devoted.

But whether parents can afford to pay for their children's schooling or not is of little consequence, unless they have the will to do so. But why should they be unwilling? The real cause is, as stated above, and as we endeavoured to show in a recent number, they cannot afford to lose the time of their children when able to work. For it is not only the penny, or twopence, or even sixpence per week which represents to the parent the cost of his child's education, but, in a great many cases, the two or three shillings which the child, when at a certain age, might have earned had he been at

r has the parent an eye only to the wages that the child may
as he can go to work, but still more to the wages that he
n he becomes a good workman. Hence he values no edu-
which will not tend to improve him as a workman, and he
ining to any employment, so soon as the bodily strength
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to this end, or be likely to render the child event-
he parents will probably be willing to continue
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ining to acts of labour, poor parents will neces-
n from school when very young. And this, by
complete answer to the common objection that
now obtain a better education than those of their em-
e children of the latter remain so much longer at school,
but gross incompetency on the part of their instructors can
em to any inconvenience in this respect. In fact, the main parti-
which distinguishes the education of the children of the poor from
at of those above them, and even gives it almost another character, is the very short period during which, for the causes above noticed, poor children are permitted to continue under school instruction. The foundation of their education is, or ought to be, the same as that of the children of all other classes who profess and call themselves Christians, namely, religious instruction. And next to religious instruction, and in many respects necessarily a part of it, is instruction in language, of which instruction the object and end in its first degree is good reading; not mere mechanical reading, but to read with ease, intelligence, and pleasure. This may be considered as knowledge of the most useful description, because it is such as may be turned to most account in after life as a means of self-improvement, and admits both of the most general application and of being used according to the particular requirements of each individual. And as regards the poor especially, it is not only an agreeable resource to those who can themselves read, but also to listeners by the cottage fireside. And together with instruction in language in this first degree, instruction also in writing and in the first principles of arithmetic, may be ranked among those elements of instruction which should be taught to the children of all classes.

But although up to this point the elements of instruction should be the same, even from the very commencement of their education, in the case of the humbler classes their early removal from school should be borne in mind. For it is evident that any education given to a child, who is to leave school whilst still a child, should be of such a description as to admit of being most easily and at once applied to the life on which it is so soon to enter. Happily both religious instruction and instruction in language admit of being thus taught, and of being taught effectively, with a view to such application. Religious instruction, whether it regards duty to God or man, may unquestionably be framed with an especial reference to those duties to which a child ought specially to attend, so soon as it leaves school for service or daily labour. And in like manner instruction in language, that is, in reading so as to understand what is read, may also be given on such subjects and in such books as have a direct bearing not only upon the first duties but also on the first active employments of the young. Thus, when children are learning to read, at least some portion of their time should be given to words relating to their most important temporal duties. And when they can read so as to understand, they should read of the manner of performing these duties well, and at the same time hear from their teacher some further explanation of them. These lessons would prove first steps, and direct the attention and observation of children to those subjects upon which their hands and their thoughts are in after life to be mainly employed. This exercise of the mind upon subjects which are to be practically followed up in after life, is, we believe, in the case of the working classes more likely to elevate and strengthen the mind than any other kind of instruction. For whilst other knowledge may be said to be held in abeyance when its possessor is engaged in actual labour, industrial knowledge will then be growing and increasing, and the mind, by having been already trained and habituated to exercise itself upon the works in which the hand is engaged, will find pleasure in taking its part by guiding the hand to an easier or more skilful performance of them. Such instruction, therefore, as admits of being readily and at once applied by the child to the business of life, is more likely to retain its hold upon the mind and to grow and increase than any other that can be given to those who, whilst still children, are taken from school and put to daily labour.

Under this belief we have repeatedly recommended the use of Manuals of Industry in our national schools. Those for girls, on cooking, household work, and needle work, have been frequently noticed. We have been particularly desirous of drawing attention to the last-mentioned of these, because, as in needle-work, actual practice may be readily combined with instruction and explanation taken out of a book, without requiring any outlay of implements or additional schoolroom; we have hoped that the use of this Manual, which may be so easily applied, will induce teachers to make trial also of the others, and that they will thus, by actual proof, become convinced that the use of books on these subjects may be of considerable and lasting benefit to their pupils, although the practical application of the knowledge acquired may not be immediate. They may rest assured that, however humble the subject-matter of these manuals may be, the exercise of the youthful mind upon it will draw out and strengthen the powers of observation and memory, and secure a continual increase of useful knowledge. And this may be as truly said of the future occupations of boys as of those of girls. The cultivation of the ground is a subject full of matter for school instruction. The differences of soil, the varieties of seeds, the variation of the seasons, the changes and successions of different crops, and the different arts of cultivation which they require—all these furnish materials of great interest, which are sure of exciting thought and observation when once presented to the youthful mind. But in order to render such matters the objects of thought and observation, they do require in the first intance to be pointed out and explained in a plain and interesting manner. In our recent notices of the agricultural schools in Ireland we mentioned as one of the most important particulars connected with them the desire manifested by the boys to learn the improved systems of agriculture, and the effect of such instruction upon them, as proved by recorded instances of their earnest and successful endeavours to induce their parents to adopt the improved system taught and pursued by their instructors. In reading the reports of these schools we met so frequently with a statement of the Agricultural Class-book being used in them, that we have been led carefully to examine it. It was published by direction of the Commissioners of National Education in Ireland, and drawn up with a special reference to the peculiar circumstances of that country. We believe, judging from the effect of reading the book ourselves, that if the supporters and teachers of schools would examine it, its perusal would greatly help to remove the doubts which appear still to prevail in some minds as to the advantage of using such works in schools, where there are no opportunities of at the same time actually employing the boys in school farms or gardens. It has occurred to us that it may perhaps induce some of our readers to look into the book with this view, if we attempt to furnish them with a sort of introduction to it by concluding this paper, as we now propose to do, with a short account of its form and an abstract of its contents.

The object of the Agricultural Class-Book is to explain in simple language the best mode of managing a small farm and cottage garden. With this view it points out the errors of the old system of farming, in the hope of saving the farmer from the evils of it, and of better illustrating the advantages of the new system. The book being specially intended for the benefit of the Irish peasantry, a part of it is devoted to domestic economy, with the intention of recommending habits of tidiness and cleanliness. The first fifty pages consist of introductory exercises in the shape of questions and answers. In these the different kinds of soil are enumerated, and their peculiarities pointed out. Perhaps technical terms may be thought to be too frequently and prominently introduced here; but they are always accompanied with explanations. Then plants are treated of, and their different parts, the different modes of producing them, and of promoting their growth, as also the soils which suit them. The preparation of the soil, and the most important things to be attended to in preparing it, as draining, trenching, subsoiling, and manuring, form the conclusion of the introductory exercises.

These exercises are followed by what may be considered a sort of application of the principles contained in them to actual practice. For this purpose, and as most likely to engage the attention of the learner, the work here assumes the form of a narrative. The person selected as the subject of it is a small farmer: because holdings of a few acres are most general in Ireland among the parents of that class for whose children the work is written. The narrative is supposed to extend over four years, and begins with the description of the state of a cottage and small farm of five acres, as it was before the new system, taught in the class-book, was adopted. In the first chapter the occupier is represented as bent upon going to America, in the hope of bettering himself and family; because the scrap of land is too tight a pattern for them to live on, and they cannot squeeze as much out of it at the end of the year as will keep the potatoes to their mouths and the clothes to their backs, besides being a year and a-half behindhand for arrears of rent. The family is supposed to consist of a wife and six children, of whom one is twenty years of age, and the other a lad of fourteen. The second chapter describes the state of the cottage and land, and the bad management shown in its cultivation. As the man and his family do not wish to leave their country if they can gain a livelihood in it, the landlord is persuaded to allow time for payment of arrears of rent, and to afford assistance in improving the land, if the occupier will adopt a better system of cultivation. This he consents to do; and the narrative then gives an account of the different steps taken, and which are represented as the results of lessons contained in this book, and interwoven with the narrative. Of course all necessary to be done from first to last is not related, but sufficient is introduced to show the changes made, and how they were made, and to account for the alteration in the state of the farm and family at the end of a few years. The farmer is supposed to act under the direction of the writer of the book as an adviser, who says, that he pointed out what should be done, and the reason for doing every thing; and often lent the family books, for they could read and write a little. But upon their complaining that the books were too hard for them, and that they forgot much of what he told them, he wrote the lessons for their use contained in this book. And the chapter ends with the first lesson, which gives a short and interesting account of the history and progress of agriculture. The principal connection of this with Ireland consists in its giving an account of the first introduction of potatoes, and the probable cause of the growth of peat bogs.

The third chapter describes the ingathering of a harvest under the old system, and explains the loss occasioned by unnecessary fences. To render this quite plain, the original form of the farm is mapped out, and also the shape into which it is proposed to divide it. Then follows a lesson upon the rotation of crops, and another upon thorough draining. In this the advantage of draining, especially for rendering clay soils ready at an earlier period for sowing, is well illustrated: "Undrained clays," it is said, "are not so soon warm for seed-sowing in spring, as naturally dry or drained soils are: because the sun causes the moisture in which the land has been steeped to evaporate, and this chills the ground. This you may prove to your own satisfaction by holding up a wet hand in the air before the sun; your hand will feel colder than before, because the water when evaporating by the heat of the sun, carries off warmth with it from your hand."

The fourth chapter points out the bad method of thatching, draining, and fallowing, of which the cottage and holding afford exemplification, and then makes use of the information contained in the preceding chapter for its correction.

The fifth chapter is on household economy, and speaks of the best food for a labourer and small farmer, recommending meal and broth, and proving that bread is cheaper and better than potatoes. An assertion often made, is here repeated, namely, that it is supposed that by proper attention to the cooking of food, and the economy during the process, the expenses for the subsistence of a family, especially of a labouring man, *might be diminished one-half.*

The garden forms the subject of chapter six, where there is an extract which we are unwilling to pass over, as it perhaps contains more truth than some of our readers may be disposed to admit. "A boy who can manage a little garden, who takes pleasure in watching the seed he has sown, who plucks out every weed as soon as it appears, and who prides himself on the fruit and vegetables which he can place upon his father's table, is more advanced in his education than he who can only read and write, however well he may do both." It is remarked in this chapter as unfortunate, that the value of a good kitchen garden is not better known by farmers and cottagers; and that a rood or half a rood (according to the number of persons in a family) may be made to yield three or four times the value of corn crops on the same extent of ground; because two or three garden crops can be obtained from the soil in a year, whereas only one corn crop can be raised from the field in the same space of time.

In this chapter a long statement is introduced of the monthly labours in a garden during each particular month of the year. Then follows chapter seven on pruning and grafting, and on training standard apple and pear trees

Domestic economy is resumed in chapter eight, and the advantage of wooden shoes is shown, where there is not the means of procuring good ones of leather; and some useful observations upon clothing, tidiness, and cleanliness are introduced. Then follows chapter nine on fowls, ducks, geese, and turkeys, which begins with observing how much money may be gained by rearing poultry. Chapter ten treats in like manner of bees; which are recommended if the cottager have a sheltered and safe spot in his garden, because the cost of keeping them is hardly anything; and on a farm they do not deprive any other live stock of food, nor at all interfere with them.

Chapter eleven returns to the management of the farm, and gives a long lesson upon manures, than which there is not in the whole range of farming subjects one more important. It divides them under the three heads of animal and vegetable, mineral, and mixed, and has a section upon each.

The general system to be pursued in the management of a small farm is summed up in the twelfth chapter. It is shown generally how the four-course shift system of rotations was brought about in three years upon the five-acre farm, described in the first chapter as out of cultivation; and it is observed that the example here given may be followed easily by others, and that the crops here spoken of as sown are the crops that all small holders on such lands as here supposed should sow. In this chapter there is a short lesson on the management of flax, another on reaping, and a third upon sowing wheat.

The thirteenth chapter is entitled, "The last harvest labours of the first year," and contains an account of getting out the potatoes, and storing the beet, turnips, and parsnips. Here notice is taken of the failure of potatoes, and the advantage of having parsnips, turnips, cabbages, and jerusalem artichokes in their stead. A lesson is also given on the cow, the dairy, milk, butter, cheese, and pigs; and it is very justly said that country boys and country girls ought to be equally well informed on the different subjects of this lesson.

Farm accounts form the subjects of a short but very plain and useful lesson in the fourteenth chapter. And really if the abstract which we have given of the previous chapters, and the brief enumeration contained in it of the many subjects connected with agriculture of which the farmer should have some knowledge, have not sufficed to convince teachers and managers of country schools, that such subjects may be successfully taught by the aid of a good class-book, we shall still hope that the perusal of this chapter may persuade them, and at all events of itself repay them for the trouble of looking into the book. They will readily perceive how easily the young may be taught by an educated person to adopt a proper system of farm accounts, but how difficult it must be for any one to puzzle out such a system in the first instance for himself.

The last chapter is entitled "the conclusion," and begins by asking a question, to which we trust all its readers will agree with us in thinking that it deserves a favourable answer. The question is, whether the reader does not know something more of farming than before he read this little book? The good advice is given, that if any subject should be found too difficult at the first reading, it should be read a second and a third time. The altered condition of the farm and its occupiers at the end of four years is pointed out; and then, after asking the question, "How was this happy change effected?" the book concludes by the answer—"By knowing how to farm five acres."

ON GYMNASTIC AND PHYSICAL TRAINING.

" ——— decoræ
More palæstræ."

In the course of last year there appeared in this Journal a series of articles descriptive of gymnastic exercises, with illustrations. It may perhaps have been found, by any of our readers who tried to turn them to account, that the practice of our directions without the guidance of an instructor or the stimulus of emulation was a painful and unpromising pursuit; and we are also aware that the uncontrolled efforts of a novice in these accomplishments may expose him to some degree of danger. Indeed, one cause of the decline of gymnastic exercises in this country, after a short period of popularity, has, we believe, been some cases of injury to those who too eagerly aspired to perfection, and to rivalry with others who had been better and longer trained. We think, however, that English schools are generally deficient in attention to these matters, and that the health, happiness, and manly spirit of our posterity is materially dependent upon their promotion. There is no feature of English society that more strongly impresses foreigners than the noble and vigorous persons of our aristocracy. Perhaps no race on earth seems so clearly intended by nature for command. This we attribute to their habits of varied bodily exertion, and to the ample time and means at their disposal for the purpose. Lord Chesterfield wisely said, that no time bestowed by the young on manly sports was thrown away. Our great public schools and universities may at least claim credit for teaching these things well, and it is to be regretted that they are not practised more under the countenance, and not in spite, of the authorities. How well this principle was understood, and how fully acted upon, by the ancient model of educators, the Athenians, may be learned in every dialogue of Plato:—

> "Moreover, in addition to this, they send their boys to the school of the gymnast, that, having their bodies in better condition, they may minister to their worthy purposes, and may not be compelled to show cowardice through the bad condition of their bodies, neither in the wars nor in their other actions."—*Plato, Protagoras*, 44.

These reasons, and many more, apply with equal force to our own youth, and it may be noticed that another leading feature in the Greek system, music, is beginning to receive increased attention in our schools. The service of this country in its distant possessions is, perhaps, the most arduous that has been seen since the vigour of the Roman rule. No other states ever put such a strain upon the energy and endurance of their citizens, and none have found them so invariably equal to the task imposed. The maintenance of the distant posts of Rome upon the Danube and the Rhine, and of our own upon the Sutlej and the Orange River, are unsurpassed examples of what a few resolute men may do; and surely a strong and ready spirit dwells most naturally in a body of like character. The advantage, however, of preparation for such service is too much confined to our schools of highest reputation, and those who envy the aristocracy their privileges are content to leave to them one of the most valuable, in which they might, if they would, participate. The race of life for most of our population now begins so early, and is so eager and incessant, that little time is allowed for any sort of education that has not its immediate commercial value. Only the few who have made the trial know how far preferable is perfect health to riches, and how tolerable it renders poverty; and nearly all who see the evil of extreme devotion to mammon are for making our people intellectual and æsthetic; but forget that it would be equally for their own good and that of the nation that they should be made strong. We wish to see gymnastics, under some control, made part of the system in all schools, and carefully practised for short but frequent intervals, which we believe to be the secret of success in every study. Some imitation, too, of the French method of military organization and exercise would be very beneficial in our education. We do occasionally see "Fencing" and "Drilling" among the extras in an ambitious programme; but they are usually learned too much by occasional fits, and are always made too completely a πάρεργον for any great good to be done by them.

It is not enough to say that there is space and time allowed for active sports by those who choose to adopt them. We want something that will include all, and reach those who from weakness, timidity, laziness, or over devotion to study, would, if they were permitted, refrain from every sort of exercise. Those who are formed by nature for deeds of strength and grace, who have θεῶν ἐρικυδέα δῶρα, and, according to the beautiful opinion of the Greeks, show, by their personal advantages, that they are special favourites of Heaven; these have no need of urging to display and to improve the qualities they have received. Meantime the shy, the awkward, and the feeble boys hold back from a competition in which it is impossible they can excel, and for which, the longer they postpone it, the more they are unfitted. We read sometimes of wondrous boys, whose play-hours were devoted always to reading and meditation, and who in after-time fulfilled the anticipations of their friends, both by an early fame and an early death. This unhappy termination of bright hopes might in the majority of instances have been prevented or postponed, by the enforcement of such a system as we now recommend. The only approach to it at present existing is, we believe, the much-decried practice of fagging, still maintained, in despite of clamour, at the old foundations. Under proper supervision, it insures that all healthy boys take part in the games played in the school, and are trained when older to be leaders in them. Modern sensitiveness runs strongly against this discipline; but this one advantage is a sufficient set-off for all the evils which have been proved against it.

There is a constitutional reserve in the majority of the English people, that renders it peculiarly desirable to adopt some method of drawing forth their latent powers. A judicious foreign observer of our great public schools, whose reflections have lately been translated in this Journal, has remarked upon the ceaseless practice of composition in English, Greek, and Latin, by which the thoughts of English boys are forced, unwillingly, from the depths of their bosoms; and thus in time ready and forcible writers are made of those who, if left to themselves, would never have produced a line. This mode of development requires, in our opinion, to be extended also to the bodily faculties of the English.

It will be admitted that the aspect of our labouring population does not in general betoken health and activity. The townsmen are pale and weak, from unwholesome confinement and sedentary pursuits. The countrymen are generally clumsy and almost deformed, by severe unrelaxed toil from an early age. There is some glimmering of hope now dawning, that the long subjection of labour to capital, the white slavery of the old world, will soon be mitigated, and that it may be possible to come a little nearer to what partisans and poets tell us was the state of England in the olden time. The law and opinion of this country, as to observance of the Sabbath, render it imperative that more than one day in seven be rescued from labour, and we may possibly see the time when five days' toil shall suffice for the support of life. Whenever this freedom from bondage is declared, all good influences should be ready to act upon the emancipated. The patrons of lecture and library are already pretty active, and wage war with some success against the beer-house and the gin-shop. Without any intermission of their useful labours, we desire to see an equally earnest advocacy of cricket and football. It may safely be assumed that the majority of people would rather play than think; and it is not unlikely that in these sports might be found, to a great extent, a remedy for the supposed dangers of secular education.

In connection with the subject of active exercises, it is proper to remark upon the irrational practice of disguising schoolboys in garments which render every kind of exercise inconvenient. The most familiar and strongest instance of this abuse is of course Christ's Hospital. There is really nothing that can reasonably be urged in support of the custom; and if the authorities could only surmount their prejudices and abolish it, we should all immediately begin to wonder how it could ever have been tolerated.

It is important to consider that not only does the health, the happiness, and the morality of our people depend much upon the promotion of games and exercises, but even our greatness and our security are nearly concerned in it. The introduction and perfection of steam-vessels of war has almost made England part of the European Continent. Sooner or later our honour, and perhaps our existence, will be in question on our own soil. We must imitate the military powers, in leavening our people with knowledge of the use of arms, if we would continue upon equal terms with them. Nothing but the gradual diffusion of the training and feelings of soldiers can now be depended upon for safety. This will be a slow process, and happily the danger does not seem imminent; and the attempts at a new system, begun last year, have been more prosperous than could have been hoped. The militia, in spite of much clamour and some coldness, is popular and progressive. It was, however, quite time that the step was taken. The modern tendency to division of labour, to make war and everything else a separate trade; the implicit trust in our navy, from which we have been but lately roused; the seductions of wealth with some, and the stern command of want with others; all these causes have combined to obliterate whatever military character we formerly possessed, and to make us masters at once of the greatest riches and the least apparent means for their defence. May this degeneracy at last be checked, and may it no longer be true of us as now, in a physical sense, it certainly is, that

> "Ætas parentum pejor avis tulit
> Nos nequiores, mox daturos
> Progeniem vitiosiorem."

PUBLIC EDUCATION AS AFFECTED BY THE RECENT BILL.

It is calculated that about a fifth, or at least a sixth part of the people of any particular country, are of an age to require that they should be under the influence of a school education. Hence, taking the lowest estimate, there ought at present to be in England and Wales 3,000,000 of scholars in our various schools, our population being about 18,000,000. The total number of scholars, however, in our National Schools, is only about a third part of this number; and if we allow half a million for private and various other schools, there still remains half the children of the whole country unprovided with the means, or heedless of the benefits of education. Much, very much, has been done of late years; in fact, 1839 may be considered the commencement of a new educational epoch. But when we consider that the easier half only of the work has yet been accomplished, the adoption of some plan by which the further advancement may be facilitated claims the first consideration in our legislative enactments.

But though so much exertion has been made, both public and private, we find that there are nearly *two and a half millions* of persons living in parishes in which there is no school in connexion with the parish—no National School. In such corners alone there may be discovered nearly half a million of children without the means of the most meagre education. Here then is still a wide field for the exercise of private benevolence and public aid. These are the children who, it may fairly be assumed, will derive a large share of benefit from the operation of Lord John Russell's Education Bill; and it is a step in advance of what has already been done to gain even this advantage to a portion of those who are at present receiving no education at all. Though the increase in quantity of education, which the proposed bill may be the means of inducing, will be small in comparison with the wants of the kingdom, it will tend greatly to improve the quality of it where the work is already going on.

It is satisfactory to perceive that the advocates of a purely secular system of education are relaxing in their opposition, and many of them are even modifying their opinions. Sir James K. Shuttleworth, in reference to this subject, after showing that education had its origin in religion, says: "No one, therefore, who has examined the history of English Public Education, can doubt that to attempt to separate it from religion would be to offer the rudest violence, not only to the traditions of the country but to its institutions, whether they be the growth of centuries or the most modern offspring of the popular will." Again, in the following passage, he pays a just tribute to the clergy for the manner in which they devote their energies to the advancement of education:—"There is a race of clergymen in our rural parishes who have learnt well from the Man of Sorrows their work among the peasantry. They see the unrepining patience of the poor; they witness and relieve the straits of their poverty; they visit them in sickness; they watch the ineffectual efforts of the dark mind to open its eye on the light of the spiritual world; they unclasp the Sacred Book which ignorance has sealed, so that it cannot even be read. From the lips of the scholar are heard the words of life. He re-enters the parish school with an often repeated vow, that the children shall not inherit the ignorance of their forefathers."

But there is a class of persons in our large cities and commercial towns, whose dwellings are almost as far out of the reach of the clergyman as their hearts are from the influence of such benevolence as described above,—the class *dangereux*, as they have been termed by our neighbours. It is among this class that we must doubtless look for the other million of children who are without the pale of educational culture,—the depths of whose ignorance and moral degradation form the great barrier to their regeneration. Mr. Symons, one of her Majesty's Inspectors of Schools, said, in evidence before a Select Committee of the House of Commons last June, on this subject: "I consider that at present there are no better means of grappling with that class than ragged schools, whose means, I think, ought to be very much increased, and also by the operation of the town missions and the Scripture readers." Till education reaches this class, it will always be partial in its operation, and the criminal courts will still be filled with juvenile offenders. Upon this class, however, the measure as it now stands will not in the least operate; it is too deeply sunk for legislation to reach, except through a criminal process; and thus, while the State is aiding two-thirds of its children, who have learnt to assist themselves, the other third is to be left benighted, and without the shadow of a hope of release. For who, having watched the progress and results of our ragged schools, will pronounce them, under their present constitution, adequate to the work to be accomplished. Neither the bill of Lord John Russell nor its exponent, the work of Sir James K. Shuttleworth, seem to regard this degraded portion of the population. The system of lending assistance where some advancement has been already made is perfectly futile, if applied to such a class as this.

It must be borne in mind too that mere instruction will not afford a remedy for juvenile crime. A writer on "Reformatory Schools" says: "I have been from my earliest infancy a devoted advocate for education; but I am satisfied that the cause of juvenile crime is not the absence of education, and that any education of the labouring classes that is not accompanied with industrial training, and their actual employment in manual and useful labour, will entirely fail in checking the growth of crime." And again, in speaking of the report of the Governor of Edinburgh gaol, and of the statement as to how many of the prisoners could, and how many could not read or write, Mrs. Carpenter says: "There is a remarkable fact elicited by the table from which this statement is derived, viz. *that the number of re-commitments of those who can read well* is much greater than of those who cannot read at all." If therefore the class of boys that fill the criminal list could be arrested in their course, other means for their complete education must be provided. Not only must a training be given which will counteract that received at home, if home it may be termed, but the pupils must be taken bodily from influences and associations which tend to demoralize them and prepare them for a life of infamy. They must be placed in schools of industry, where not only their minds may be cultivated and their higher faculties brought under the influence of Christian precepts and practices, but where they may receive such training as will fit them to earn their daily bread in a reputable manner.

The subject is one of great difficulty, and one that calls loudly for the attention of the philanthropist. Our legislature does not attempt to meet it; but it is allowed to correct itself by the influence that the more fortunate classes are expected to exercise. We may however as reasonably expect advantage to arise to our national schools from our collegiate system of education, as expect that the education which the middle classes are receiving will have any indirect action upon a class so degraded.

PROGRESS OF EDUCATION.

A PARLIAMENTARY paper, just published, contains a return of the number of scholars in day and Sunday-schools in England and Wales, in the years 1818, 1833, and 1851. It appears from this return, that in 1818, when the population of the kingdom amounted to 11,642,683, there were in England 19,230 day-schools with 674,883 scholars, and 5463 Sunday-schools with 477,225 scholars. In 1833 the population was estimated at 14,386,415; the number of day-schools 38,971 with 1,276,947 scholars, and 16,828 Sunday-schools with 1,548,890 scholars. In 1851 the population was 17,927,609; there were 46,114 day-schools with 2,144,372 scholars, and 23,498 Sunday-schools with 2,407,409 scholars. The proportion of day scholars to the population in the years mentioned was as follows:—In 1818, one in 17·25; in 1833, one in 11·27; and in 1851, one in 8 36. The proportion of Sunday scholars to the population was—in 1818, one in 24·46; in 1833, one in 9·20; and in 1851, one in 7·45.

Notices of Books.

THE FALL OF THE ROMAN REPUBLIC. BY CHARLES MERIVALE, B.D.

(*Longman and Co.*, 1853.)

THE author of this book is already well known to scholars and the public by a copious history of the Roman Emperors, beginning with Julius Cæsar, and intended, we believe, to reach down to the last periods of the empire. This is of course too extensive a work to be within the reach of many, or in general use, and Mr. Merivale has comprised within a single volume the period of Roman history which immediately precedes the final overthrow of the Commonwealth. We need hardly say, that what Mr. Merivale does at all he does well; and the present volume fully sustains his character already earned.

His object has been, as he informs us in his preface, to present in one view the whole cycle of revolutions which overthrew the great republic, and to condense the history of the last hundred years of her existence into a single volume, adapted to the use of the general class of readers. He consequently has endeavoured to present a rapid narrative of events in such a manner as to fix a permanent impression on the mind, omitting all minuter details and disquisitions on manners and institutions. He begins with a graphic and boldly-coloured account of the Gracchi, and their patriotic attempt to introduce an Agrarian law, and so check the power of the great Roman oligarchy—that veritable scourge of God.

This account is written in a popular and stirring manner, very different from, and far more impressive than, the usual dry matter-of-fact style adopted in such historical records. Anecdotes and striking expressions of the chief actors in these scenes are often introduced, in order to arrest the attention, and enable us to figure the characters as passing before us, and ourselves as moving amongst them. We then proceed in due course to the great war of factions under their respective champions, Marius and Sulla, touching on all the intermediate events of interest. After the overthrow of the constitution, so elaborately and at such fearful cost reared by the latter, the history follows the great names who begin to figure importantly on the stage of public affairs; and the fortunes of Crassus, Pompeius Magnus, and Caius Julius Cæsar are discussed—discussed, not in the dry language of pedantic learning, but in the popular and broad style suited to the general reader.

After the death of the great dictator—an especial favourite with Mr. Merivale—we still have the civil broils of Antonius and the founder of the Roman empire, Octavianus, most spiritedly treated of; until at last, on the defeat of the triumvir, Antonius, too impetuous and rash for his wily and scheming compeer, Augustus, centered in himself the sole power of the mistress of the world, until, in short, the great Roman republic fell, and an empire huge and gorgeous rose upon its ruins. We thus have brought before us, in pictured truth, the fall of the noblest commonwealth that ever arose in the ancient world, and therewith the ruin of that great nobility who had fought and conquered in every land. Henceforward their greatness and victories were at an end; for, in Mr. Merivale's spirited language, "debarred from the annual plunder of conquered lands, their fortunes dwindled away in ostentatious indolence at home. The Cæsars, not satisfied to await the sure operation of idleness and dissipation, studied to break down their independence by impoverishment and confiscation. The great Roman oligarchy, the most frightful instrument of human suffering ever inflicted on the world, which had survived the proscriptions of Marius and Sulla, the wars of Cæsar and Pompeius, the massacres and spoliations of Antonius and Octavius, fell at last under a just retribution, and amidst the torments of a Nero and Domitian perished in blasphemies and execrations."

Once more we congratulate Mr. Merivale on producing so excellent a work.

THE PRACTICE AND THEORY OF ARITHMETIC, WITH EXAMPLES AND METHODS. BY THE REV. W. F. GREENFIELD, M.A., LATE SCHOLAR OF PEMBROKE COLLEGE, CAMBRIDGE, SECOND AND MATHEMATICAL MASTER IN QUEEN ELIZABETH'S SCHOOL, IPSWICH. (London: *Longman & Co.*)

THIS is a work of considerable merit, but is written on a plan that requires some explanation. The writer does not intend it as a book to aid lower-class elementary education: he writes for middle-class, preparatory, or grammar schools; but his book contains much that would be useful to pupil teachers. It must, in fact, be considered more peculiarly the text-book of the teacher than of the scholar. To understand the nature of the work it is necessary to have a clear perception of the distinction between *examples* as understood in the sphere of elementary education, and *examples* as comprehended by those acquainted with the course of a collegiate education. In the former case, the term includes a variety of exercises, questions, or problems to be wrought out by the pupil upon some previously communicated or otherwise ascertained and well-known principle: in the latter, examples consist of a digest of illustrations thoroughly wrought out and ready for the undisturbed study of the student. In the work before us, "examples" bears this latter signification, and "methods" indicates the modes and steps by which the results are obtained. These two, then, comprehend the Practice, while the Theory is treated in a subsequent and distinct portion of the work. Both parts of the book are very creditable performances, although some of the expositions in the Theory might be far more simple and quite as effective, and the Practice throughout is too much dependent upon dogmatic rules, too much isolated from the theory, and consequently unconnected with principles.

SELECT SPECIMENS OF ENGLISH PROSE, WITH EXPLANATORY NOTES AND QUESTIONS, AND AN ETYMOLOGICAL APPENDIX OF GREEK, LATIN, AND SAXON ROOTS; FOR THE USE OF SCHOOLS AND PRIVATE READING. BY EDWARD HUGHES, F.R.A.S. ETC. (London: *Longmans & Co.* 1853.)

THIS selection consists of about three hundred pieces of prose, interspersed with choice illustrative pieces of poetry. The plan of the book is to arrange the readings under the respective heads of subjects. Thus, there is about an equal number under "Geography and Natural History," "History and Biography," "Education and Progress," "Sea and Maritime Adventure," "Imagination and Sympathetic Affections," "Science and General Knowledge," and a double portion under the head "Religious and Moral." Words of difficulty or peculiarity are selected from the lesson and placed at the top for grammatical, derivative, and exegetical exercise before commencing the reading, while at the end of the lesson a moderate number of questions and explanations is appended, calculated to lead the reader to a more thorough comprehension of the matter. It should be remarked, however, that the editor cannot have given this list of words and his questions and expositions as the only ones upon which the pupil's intelligence is to be exercised; but merely, it is presumed, as an indication of the method which should be adopted. We can scarcely imagine a stage in a boy's progress when such an exercise becomes unnecessary, although it must vary in extent with his capabilities. The etymological Appendix is very useful for the scholar's private study in connection with the lessons. This book is one of the most useful of Mr. Hughes's series of school-books, and although it must be limited to the highest class in our best elementary schools, it is worthy of general use. It is the best school selection we have seen.

NOTES AND NARRATIVES OF A SIX YEARS' MISSION, PRINCIPALLY AMONG THE DENS OF LONDON. BY R. W. VANDERKISTE, LATE LONDON CITY MISSIONARY. (London: *Nisbet & Co.* 1853. Third edition.)

THESE are notes and narratives partly made by the author during his mission in the parish of Clerkenwell, and partly culled from other sources. He had been supported during that period by a single subscriber to the London City Missionary Society, a member of Parliament; and these notes show that the subscription was judiciously appropriated to missionary exertions. We think that the Society will regret the loss of his labours, more especially as he appears to be engaged in an employment purely commercial.

The Society took its rise in 1835, sending out in that year four missionaries only. At the present time there are 270 engaged in this city, and the annual receipts have risen to about 23,000*l.* These men, who are selected for earnestness of character and devotion to the cause of religion rather than for cultivation of intellect, are, according to their capabilities, appointed to certain spheres of labour—amongst the watermen, the Irish, the police, &c.; and we understand that one is about to be appointed missionary to the deaf and dumb. We think that much care should be exercised by such a Society to guard against the possibility of their emissaries becoming, what in some cases this book would indicate, spies upon the privacy of the poor. A disposition would soon be created to bring cases of novelty and supposed interest under the notice of the committee, that might induce an inquisitiveness amounting, in the sensitive imaginations of the poor, to an organised system of espionage. The book contains much that will interest all connected with the parochial labours of large towns.

SALLUST'S JUGURTHINE WAR; WITH ENGLISH NOTES. EDITED BY REV. H. BROWNE, M.A. (ARNOLD'S SCHOOL CLASSICS.) (*Rivington*, 1853.)

This is an additional volume of the course of school editions of the classical writers issued under the superintendence of the late Mr. Arnold. Mr. Browne, one of this gentleman's chief coadjutors, has brought out this edition of the Jugurthine War of Sallust in the form in which it was found ready for publication at Mr. Arnold's death. We do not think it will add anything to the late editor's reputation, or claim much respect to itself on the score of utility. An edition of the works of Sallust has been recently given to the world by Mr. Merivale, upon which this is no improvement. The method usually adopted by the late Mr. Arnold and his associates, that, namely, of translating boldly and without much discrimination from the German editions, has been rigorously followed in the present case. The notes of F. Jacobs, who edited the whole of Sallust, have apparently been translated bodily; accordingly, we are repeatedly advised to consult the note on such a passage of the Catilinarian Conspiracy, and of course, as the book does not contain it, we are not much wiser for a note only found in the original German edition. As usual, the notes are full of parentheses and additions from different editions. We are within the mark if we say that in one note there are seven or eight of these. These repeated addenda disfigure the book, and tend to perplex and confuse the ideas of the younger readers, for whom the work is chiefly intended. We should recommend Mr. Browne, if he proposes to carry on the undertaking, to select his notes judiciously, and reject those which he considers wrong, instead of reprinting all, and correcting them by means of addenda and brackets, until he produces utter confusion.

ANSWERS TO THE MATHEMATICAL QUESTIONS.

QUES. 175.—*Proposed by Mr. John Smith, Manchester.*

Given $x^4 + 4a^3x = a^4$, to find x.

Answered by Mr. John Godward, and Socius.

Transposing $4a^3x$ and adding $2a^2x^2 + a^4$ to each side we have

$$x^4 + 2a^2x^2 + a^4 = 2a^2(x^2 - 2ax + a^2),$$

$$\therefore x^2 + a^2 = \pm a\sqrt{2}(x - a),$$

$$\text{or } x^2 \mp a\sqrt{2}.x = \mp a^2\sqrt{2} - a^2,$$

The four roots of which are

$$\frac{a}{2}\left\{\sqrt{2} \pm \sqrt{-(4\sqrt{2} + 2)}\right\} \text{ and } \frac{a}{2}\left\{-\sqrt{2} \pm \sqrt{(4\sqrt{2} - 2)}\right\}.$$

QUES. 176.—*Proposed by Mr. John Thompson, London.*

From a company of 60 men, 6 are draughted off every night on guard: on how many different nights can a different selection be made? and on how many of these will two given men be found on guard?

Answered by Mr. Wm. Godward, jun., and Mr. W. H. Levy.

The number of nights on which a different guard can be selected will be the number of combinations which can be made of 6 out of 60 men; that is,

$${}_{60}C_{6} = \frac{60 . 59 . 58 . 57 . 56 . 55}{1 . 2 . 3 . 4 . 5 . 6} = 50063860.$$

And the number of nights on which two given men will be found on guard will be

$${}_{2}C_{2} \times {}_{58}C_{4} = \frac{58 . 57 . 56 . 55}{1 . 2 . 3 . 4} = 424270.$$

QUES. 177.—*Proposed by Amicus.*

Resolve a given force into two others, whose difference shall be given, and which shall act at a given angle.

Answered by A. G. P., and Mr. Wm. Godward, jun.

Let r be the given force, p and q its required components, and α the given angle; put $p - q = d$, then by art. 58, Tate's Mechanical Philosophy,

$$p^2 + q^2 + 2pq\cos\alpha = r^2 \; . \; . \; . \; . \; (1)$$

$$\text{also } p^2 - 2pq + q^2 = d^2 \; . \; . \; . \; . \; (2)$$

Subtracting (2) from (1), we have

$$2pq(1 + \cos\alpha) = r^2 - d^2, \text{ or } 4pq\cos^2\tfrac{1}{2}\alpha = r^2 - d^2$$

$$\therefore 4pq = \frac{r^2 - d^2}{\cos^2\frac{1}{2}\alpha} \; . \; . \; . \; . \; . \; (3)$$

Adding (2) to (3) and reducing

$$p^2 + 2pq + q^2 = \sec^2\tfrac{1}{2}\alpha.(r^2 - d^2\sin^2\tfrac{1}{2}\alpha)$$

$$\therefore p + q = \sec\tfrac{1}{2}\alpha.\sqrt{(r^2 - d^2\sin^2\tfrac{1}{2}\alpha)}$$

$$\text{but } p - q = d$$

$$\therefore p = \tfrac{1}{2}\left\{d + \sec\tfrac{1}{2}\alpha.\sqrt{(r^2 - d^2\sin^2\tfrac{1}{2}\alpha)}\right\}$$

$$q = \tfrac{1}{2}\left\{-d + \sec\tfrac{1}{2}\alpha.\sqrt{(r^2 - d^2\sin^2\tfrac{1}{2}\alpha)}\right\}$$

QUES. 178.—*From the Senate House Problems for* 1853, *communicated by Mr. W. H. Levy.*

If a, b, c, d, be perpendiculars from the angles of a quadrilateral upon the diagonals d_1, d_2, show that the square of the sine of the angle between the diagonals is equal to

$$\frac{(a+c)\,(b+d)}{d_1\,d_2}$$

Answered by Amicus, A. G. P., and A. M.

Let a, c be the perpendiculars from the angular points A, C on the diagonal B D or d_2, and b, d the perpendiculars from the angular points B, D on the diagonal A C or d_1; also let O be the point of intersection of d_1, d_2, and θ the angle included between them; then

$$a = \text{A O} \sin\theta,\ b = \text{B O} \sin\theta,\ c = \text{C O} \sin\theta,\ d = \text{D O} \sin\theta;$$

$$\therefore a + c = (\text{A O} + \text{C O}) \sin\theta = d_1 \sin\theta$$

$$b + d = (\text{B O} + \text{D O}) \sin\theta = d_2 \sin\theta$$

$$\text{hence } \sin^2\theta = \frac{(a+c)\,(b+d)}{d_1\,d_2}.$$

LIST OF MATHEMATICAL ANSWERS.

Amicus, ans. 177, 178; John Godward, Chelsea, ans. 175, 176, 178; William Goward, jun., Chelsea, ans. 175, 176, 177, 178; W. H. Levy, Shalbourne, ans. 176, 177, 178; A. M., ans. 178; A. G. P., Herts, ans. 175, 176, 177, 178; E. Rutter, Sunderland, ans. 177, 178; Socius, ans. 175, and T. T. Wilkinson, Burnley, ans. 178.

NEW QUESTIONS,

TO BE ANSWERED IN OUR NUMBER FOR AUGUST, 1853.

QUES. 179.—*Proposed by Amicus.*

A and B can reap a field of wheat in m days, B and C in n days, and A can do p times as much as C in the same time; in what time would the three reap it together?

QUES. 180.—*Proposed by Mr. W. H. Levy, Shalbourne.*

If O be the centre of the circle inscribed in the triangle A B C, then will

$$\frac{\text{A O}^2}{bc} + \frac{\text{B O}^2}{ac} + \frac{\text{C O}^2}{ab} = 1.$$

QUES. 181.—*Proposed by Mr. T. T. Wilkinson, Burnley.*

Let the sides C A, A B, B C of the triangle A B C be in arithmetical progression, O the centre of the inscribed circle, R, r the radii of the circumscribed and inscribed circles, and C K perpendicular to A B; prove that

$$\text{A C} - \text{B C} = \tfrac{1}{2}(\text{A K} - \text{B K})$$

$$\text{and A C. B C} = 6\,\text{R}\,r = 3\,\text{C O}^2.$$

QUES. 182.—*Proposed by A. G. P., Herts.*

In a parabola of which the plane is vertical and axis horizontal, find the normal down which a body will descend in the least time.

⁂ It is particularly requested that all mathematical contributions be forwarded, at *latest*, by the 20th of each month.

To Correspondents.

If A. M. will furnish his correct address, he shall have an answer to his letter of 27th ultimo.

THE MENTAL IMPROVEMENT OF THE INDUSTRIAL CLASSES.

One of the most important questions intimately connected with the education of the children of the working classes is, How to carry on in after life the instruction commenced at school. As we observed in a recent number, the main distinction between the education of children of this class and that of those of the middle and upper classes arises from the short period during which the former are permitted to remain under school instruction. At so early an age as ten, or even eight years, they are often capable of earning sufficient to make their wages an object of moment to their parents. Thus they are compelled, whilst mere children, to enter upon the employments and duties of active life, and their literary instruction ceases before their mental faculties have attained any degree of development. Hence, what has been learned at school is generally in such cases either entirely forgotten, or so imperfectly retained as to prove almost worse than useless. The improved system of teaching, however, which is now gradually spreading throughout the country, and the increased value attached by parents to the education of their children, combine to render it probable that before long such progress will generally be made by young children, before they leave school, as will enable them to retain permanently much more than has been the case hitherto. For instance, they will have acquired the power of reading and writing with sufficient facility and understanding to enable them to use these acquirements afterwards without over-exertion or difficulty. And, which is of much more importance, this progress will probably also render many desirous, by their own exertions, or by mutual assistance, to keep up what they have learned, and to add to it. It will also be a matter of no great difficulty to assist young persons so circumstanced and so disposed. And, we may add, it is a positive duty to provide such young persons, as far as possible, with the means of cultivating rightly the knowledge they have obtained, that it may prove a blessing to them and not a curse.

In considering the best method of providing such assistance, it is obvious that, as the parties concerned are for the most part to be voluntary agents, the system most likely to succeed is one based upon a principle of mutual improvement. And such a system is most likely not only to work well amongst those who have already attained to a certain measure of knowledge, but also to extend its influence to many of those whose early education has been greatly or entirely neglected. Happily, we need not have recourse to reasoning to establish this point, since we have the surer guidance of actual experience. We need only refer to the account contained in our April and July numbers, of the important movement which has now for some time been going on in the factories of Price's Patent Candle Company. From that account it appears that, previous to 1848, some half dozen of the factory boys were in the habit of hiding themselves behind a bench two or three times a week, after they had done their day's work, to practise writing on scraps of paper with worn-out pens begged from the counting-house. This being encouraged by the foreman of their department, the boys persevered and were joined by others, until their number increased to about thirty. They then met with further encouragement from the superiors of the company, and in the winter of 1848 a school-room was provided. As they increased in numbers, they found it necessary to depart from the principle of self-government and mutual improvement, and to place themselves under authority, although the exercise of this authority is now often guided by a general vote: as, for instance, in all cases of fixing the days and hours for schooling. Of the further progress of these youths we need not here speak, nor do more than refer our readers to the accounts which have already appeared in our pages. The point to which we desire to draw attention is the effect of this educational movement upon the older workmen.

From the special report made by the directors to the proprietors of the Patent Candle Company, it appears that in March, 1852, a plan for the constitution of a Mutual Improvement Society was brought to one of the directors, with a request that he would allow himself to be named as president. A meeting was held for the establishment of such a society, which was well attended, and ended by seventy-two of the men paying on the spot the small entrance fee required as a pledge of being in earnest in wishing to join it. It is expressly mentioned that this society started up spontaneously in full strength. It is entirely formed by the men, and will be managed entirely by themselves; but its origin and establishment are attributed to the effect produced upon the factories by what had been going on during the three previous years among the younger workpeople. Just after the establishment of the society, one of the foremen observed to a director that, three years before, it could not have been formed. This he explained by saying, "I mean, sir, that we are living in a different atmosphere, and that men cannot help assimilating themselves to the system in which they happen to be, whether it is good or evil." As to the further progress of this Mutual Improvement Society, we will only repeat the statement in our July number, that after eight months' trial it has succeeded so well as to leave no doubt of its permanence and usefulness. Similar societies have been established in two other of the company's factories, and in connection with one of them an experimental class has been formed, which is at present hard at work making a lot of philosophical apparatus.

We cannot expect, at all events for the present, to see many instances of such successful efforts for mutual improvement as are to be found among both men and boys under the wise and generous patronage of the directors and proprietors of the Patent Candle Company; but we maintain that the same desire of self-improvement exists among not a few of the young people in other factories as that which so happily manifested itself in the half dozen boys with whom originated the movement to which we have alluded in this particular case. We believe, too, that there are not a few owners and managers of factories who would gladly promote among their workpeople any such desire of self-improvement, if they only knew how to encourage and direct it in a safe and efficient manner. And as like causes for the most part produce like results, we venture to hope that, as the example we have referred to becomes more generally known and appreciated, it will gradually lead masters and men to make similar exertions and be productive of similar benefits, varying according to the different circumstances of different establishments, and according to the prudence and zeal of the parties concerned. Mutual improvement by voluntary efforts must be the object aimed at by the workpeople. On the part of their superiors there should be kind and generous encouragement and wise and friendly direction, without any approach to interference. That such co-operation is possible and practicable—nay, that it may without difficulty be brought to a successful issue where the parties understand one another, and are rightly disposed—the above cited example abundantly proves. It cannot be too carefully studied. We trust that all the particulars of this remarkable movement will be accurately recorded, and from time to time communicated to the public for the benefit of society at large. In such a work, the object of which is mutual improvement by voluntary agents, the results of experience are peculiarly valuable, as showing both what to do and what to avoid. When, as now, in almost every case a beginning has to be made, one of the first steps is to inquire how to make it. This consideration has induced us to lay before our readers the substance of some very able remarks, contained in an address delivered more than two years ago at a general meeting of persons desirous of establishing an institution in their town for the mental improvement of the industrious classes, and which appears to us well calculated to promote the object to which it relates.

The address* opens with stating that it has been drawn up in order to point out the advantages that may be expected from such an institution, and that practical utility is the object to be kept steadily in view. Hence the subject for consideration in the present case is what may reasonably be aimed at in the particular town of Ware (of which the population is about 5000), with from one to two hundred subscribers to the institution, drawn chiefly from the shopkeepers and operatives of the place, and with an income of from 50*l.* to 60*l.* per annum. In other words, the question is, what do the persons concerned propose to accomplish by associating together and pouring their subscriptions into a common fund, more than they could do by keeping their subscriptions in their own hands and laying them out, as fancy might suggest, each for himself? The answer to this question will, in fact, be a description of the proposed institution.

This question is first answered in respect of the proposal to establish a well-selected and tolerably extensive Lending Library for the members of the society. It is remarked that, as a mere matter of pounds, shillings, and pence, by combination of numbers a far greater amount of enjoyment may be secured to each contributor. Thus, if two men lay out 6*s.* apiece in books, and lend their purchases to each other, both are great gainers by the arrangement. If, instead of two, four persons are supposed to do the same thing, the advantage is still greater; and the more we increase the numbers so combined, the more is this advantage increased. Nor is the opportunity thus afforded of perusing a larger number of books the only advantage thereby gained. In consequence of difference in individual character and taste there will be a certain variety in the subjects which appear most attractive to each, which will in all probability render a collection of books, purchased by the combination of a number of persons, of greater merit than would belong to a collection of equal money value procured by one person acting upon his own judgment. The same advantage will be obtained if a large number of persons delegate their own right of purchasing to a number of others in whose judgment they may have confidence. The result will be a varied collection in which there will be much that is new to every one, and much therefore that will tend to enlarge the mind of each, to suggest new thoughts to him, and to show him that there is a great deal in the world which he never dreamt of: and thus by combination to exchange the absolute possession of six shillings' worth of books for the liberty to make use of a hundred times six shillings' worth, is a step from which alone much mental improvement might be expected.

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* "Rules of the Ware Institution. To which is prefixed an Address, delivered December 6th, 1850." By J. W. Blakesley, B.D., Vicar. Pp. 31. (Ware: E. Price.)

It should be remembered, too, that a book is, in fact, a thing of life, the record of that which is most living in the composer, namely, his thoughts. When we read a book we are in truth holding converse with a man who tells us what he has felt, and in that way in which he fancies he can tell it best. The author may have long since passed away, but the book takes us back to him and his belongings, and we listen to him as well as those did who were born in the same village with him, or were inmates of the same house. If seeing and conversing with many different living men, of various habits and various ways of thinking, tend to make a man wiser, more tolerant, more disposed to give others their due, more ready to look at questions from various sides before deciding upon them, then benefits of the same kind must flow from converse with men's thoughts embodied in their writings. And thus the establishment of a well-selected Lending Library may be productive of much mental improvement.

It is proposed also to establish a reading-room, to be open during those hours which the industrious artisan has to spare from his labours, and in which he requires something which may afford him relaxation and pleasure, and which it is most important should be of a harmless, and, if possible, of a beneficial character. Whilst men are engaged about their work, whatever it may be, let it fully occupy their thoughts; but this must not be, and cannot be every day, and the whole of every day, without intermission. Such incessant labour would defeat its own object. It cannot be continued for any length of time without the desire of change becoming irresistible. Hence the origin of many of those vicious excesses which tend to destroy both body and soul. A man thoroughly jaded with work must have some excitement at any price. The ale-house with its warm fire, its newspaper, its gossiping frequenters, has attractions for one worn out and stupified by incessant toil, which those who have been spared such trials can hardly understand. Here are those first temptations to vice and intemperance which have wrought the ruin of so many. To the industrious operative, who on coming off his work is exposed to them, we would say, Come to our reading-room, where you will find more comfort, better company, and more rational amusement than you could possibly obtain at the beer-shop. You will find some newspapers and entertaining and instructive books. You will not be molested by quarrelsome or offensive companions, nor by the sound of blasphemous or indecent expressions; only those are admitted who are desirous of spending their evening in a quiet and peaceable manner, and in such amusements as leave a man poorer neither in purse, nor heart, nor head. What a different kind of welcome awaits a man on a Saturday night when he comes home out of the ale-house to his wife and children, from that which he will receive after spending an hour or two in such occupation as the reading-room will be able to offer him. In the one case he arrives with an aching head and a light pocket, vexed with himself for having indulged far beyond what he had at first intended; out of humour with his family because out of humour with himself; jaded and weary when the false excitement of drink has passed away; none the better in body, and much the worse in temper for what has happened. In the other case what satisfaction will fill his own heart and the hearts of those near and dear to him when the whole undiminished earnings of the week can be laid on his cottage-table, and he can say, These are my wages without the abatement of a single penny for any selfish indulgence! The working man who has obtained this mastery over temptation is deserving of the highest respect and esteem from every one, and his superiors are bound to the utmost of their power to encourage and assist him in obtaining it. To this end they should endeavour to elevate him in the social scale, not so much by holding out hopes of rising into a higher rank, as by showing him how many of those advantages which at present he thinks are confined to those above him, are quite within his own reach. Thus it may be proved to him, and that through his own experience, that the necessity of earning his daily bread by daily labour need be no obstacle to his obtaining a very considerable amount of knowledge, and so of that pleasure which results from the possession of knowledge. And it is quite certain that if a man once takes sufficient pains in acquiring knowledge to feel real interest in any one subject whatever, its pursuit will secure him as much happiness as he could possibly enjoy if he had thousands a year.

But whilst it is thus proposed to provide a good Lending Library and Reading Room at the small cost of eighteen pence a quarter, and thus to offer to the industrious operative an alternative to the excitements of a lower kind which continually terminate in ruin, it must not be forgotten, that these advantages are something very different in the hands of an educated and an uneducated man. The latter requires some degree of guidance in order to learn to make use of the advantages thrown open to him. It is almost essential, therefore, to the full success of the proposed scheme, to superadd to the arrangements for a lending library and reading room others which may render it a society for intellectual improvement; one of those which, under the several names of Literary and Scientific Institutions, Mutual Instructive Societies, and Mechanics' Institutes, already exist in many of the considerable towns of England.

The object of the proposed institution is to raise men who work with their hands for means to support their families, above low tastes and mere animal indulgencies; and to make them feel that the true vocation of every man is to bring out those parts of his nature which distinguish him from the lower animals, not to gratify those appetites which he has in common with them. They require, when the day's work is over, something which may help to unfold those higher faculties—the faculties of reason and imagination—which they possess in common with the best born and the best educated, and to provide them therewith should be a main object of the proposed institution.

In England there are many instances, which every one has met with, of men born in the humblest station raising themselves, by the energy and strength of their characters, to wealth and honour. There are, moreover, examples of men of humble birth, who, by taking advantage of the opportunities offered to them, have arrived at a place not only among the rich and powerful, but among the wise and the cultivated; whose names are recorded in the list of those famous in the world of letters or of science, or as the authors of some useful discovery which benefits thousands. Richard Arkwright and Benjamin Franklin are mentioned as very remarkable illustrations of the truth of this remark, which is also illustrated by an anecdote of the late Sir Francis Chantrey, which, being new to us, we are tempted to copy. He had been dining with a gentleman whose house is well known as a centre of all that is most cultivated and refined in English society, and, on rising from table, he stood for a few moments looking at a carved pedestal which stands in the dining-room supporting a vase of remarkable beauty. His host, observing that his attention was attracted by this, pointed out to him some of the details of its execution, and was astonished to receive the answer, " Yes, I know all about it: I myself carved it. I was at the time working as a journeyman for five shillings a day; and I came into this very room and took your instructions in my working dress."

From these illustrations the address very properly proceeds to guard against any misconception that may arise from the mention of such remarkable instances of success. Success of this kind is not to be despaired of, yet, it is very wisely added, there is another kind of success which may fairly be reckoned upon, and which is of greater importance, namely, the elevation of the character and the enhancement of the pleasures of the great mass. God has given to few the capacity to elevate themselves above the station in which He has placed them; but He has given to almost all the capacity of surrounding themselves in that station with harmless and rational enjoyment. The industrious operative, although he may not have his ambition gratified by following in the steps of Arkwright, or Franklin, or Chantrey, will be amply repaid any sacrifices which he may have made in such a hope, by the increased command over himself, the increased taste for intellectual pursuits, the increased comfort of his humble home, and the increased respect of his superiors, all of which it is absolutely certain he will obtain.

In conclusion the address states what is proposed to be done in order to further the interests of those members of the association who will thereby be introduced for the first time to the means of any superior cultivation. Assistance of other than a pecuniary kind will be looked for from those members whose destiny in life has been such as to qualify them for conveying advice and instruction to the rest. This boon may be conferred in many different ways, as by the orderly administration of the society, by judicious arrangements to secure as much benefit as possible from the available funds, by an advantageous selection of books, of lectures (if practicable), and of all other means of general improvement. Regulations to be useful must be based upon that knowledge of the future members which is yet to be obtained. To gain this knowledge, the writer of the address considers the most promising expedient to be one which, if adopted, will give the proposed institution the character of a society for mutual instruction. The expedient recommended is, that occasional meetings be held, at which some subject of general interest shall be discussed in as popular and conversational a manner as is consistent with order, and with the attainment of some definite conclusion. At these meetings there will be an attendance of members proportional to the interest which such topics excite; and the share taken in the discussion by the bulk of the parties present will enable the members to feel, as it were, their own pulse, and gradually to ascertain both the degree and kind of instruction, by professional lecturers, which will be likely to prove either acceptable or beneficial. Such meetings might be commenced by some member reading an essay on any subject to which he had given more than ordinary attention, and this would naturally elicit remarks, and so interesting and valuable knowledge would be communicated to many, while the more ignorant would indicate the particular region of thought in which enlightenment is specially required. And if any member desired to turn attention to any particular subject, but felt averse to put together remarks of his own, a chapter from some printed book, if only sufficiently insulated in its subject-matter, might be substituted for an original essay. In the first stage of the existence of the society arrangements might be made for the formation of voluntary classes in certain definite subjects, as the modern languages, the elements of geometry, vocal music, practical mechanics, and many other matters.

One or two things are pointed out in order to be avoided. The necessity that, as members of a mixed body, they should mutually give and accept intellectual guidance from one another, should make them watchful to resist the bias to blight that sympathy with one another's habits of thought, which is the essential bond of union between them. No one should join at the outset who intends, as soon as he finds himself overruled in any particular, to give way to a fit of ill-temper, and either quit the society, or remain in it for the purpose of hindering its harmonious action. Questions of a religious and political nature, and matters of local dispute, are to be excluded from entrance in any shape into the society. It is proposed to confer a large amount of discretionary power upon the officers of the society; but these officers are to be chosen by the members themselves, and therefore it will be their own fault if they elect persons in whom they cannot place confidence.

We would gladly add to our abstract of the address the Rules of the Institution, at the formation of which it was delivered. But we have already exceeded our limits, and can therefore only express, in conclusion, the pleasure we shall have in making the pages of our Journal a means of conveying to our readers any further information respecting the progress of this institution, which any one of its members may favour us by communicating, as being likely to promote the objects which a Journal of Education has in view.

PAPERS ON PHYSICAL GEOGRAPHY. No. 3.

VOLCANOES (*continued from p.* 257).

THE most obvious characteristic of a volcanic mountain, when not actually burning, whether its fires be extinct or merely dormant, is its shape. The volcano is nearly always of conical form, with the apex, or point of the cone, truncated; and, in its place, a hollow or depression toward the heart of the mountain—the well known *crater.*[*] Besides the principal crater, there are, in the case of some volcanoes, numerous minor cones of eruption from which the central heat has made its force manifest at various periods. Thus, no fewer than eighty minor cones, each with its separate crater, are irregularly scattered around the sides of Etna. When its fires have been dormant for any lengthened period, the mountain, which at intervals exhibits the most tremendous force, may display, in the aspect of its crater, nothing calculated to disturb the idea of profound calm and repose.

In the early part of the seventeenth century, when there had been no violent eruption of Vesuvius for a period of nearly five centuries, the appearance of the mountain is thus described: "The crater was five miles in circumference, and about a thousand paces deep; its sides were covered with brushwood, and at the bottom there was a plain upon which cattle grazed. In the woody parts wild boars frequently harboured. In one part of the plain, covered with ashes, were three small pools; one filled with hot and bitter water, another salter than the sea, and a third hot, but tasteless."[†] But, in 1631, this state of repose was violently interrupted; the grassy plain and wooded sides of the crater were blown into the air, and the volcano again exhibited itself as a duct of connexion between the heated interior of our globe and its external superficies.

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[*] So called from its cup-like shape.—Lat. *crater.*

[†] Hamilton's "Campi Phlegræi," quoted in Lyell, Vol. II. p. 77.

The general direction of the strata of which the mountain is composed, dipping from the centre *outwards*—a natural consequence of the accumulated showers of ashes and other ejected matter—is another indication of volcanic agency in its formation. But besides these marks, and more unvarying than either, there is the information conveyed to the geologist by the structure of the rock, which in the case of a volcano (whether of ancient or modern date) always possesses a vitreous aspect and fracture, exhibiting a tendency towards a crystalline arrangement of its particles. This alone would determine the volcanic character of the mountain, even though all traces of a crater were lost, and the form were entirely different from what it ordinarily is. Where streams of lava have flowed from the crater, their position relatively to other beds of rock, aided by an examination of the fossils which the latter contain, determines the respective ages of their issue. Thus the lavas of Ischia (a small island on the northern side of the Bay of Naples) must have flowed since the period when the waters of the Mediterranean first became peopled with their present forms of life; because in the beds of rock interstratified among them, there are found numerous species of *testacea* identical with those now existing in the adjacent sea. Yet no signs of volcanic activity have been experienced in Ischia for the last five centuries; and previous to the year 1302 (when a violent eruption occurred) it is believed to have been at rest for a lengthened period. Its fires are dormant, but they belong to the modern period; and the island must be included within the volcanic region lying around Naples, and claiming Vesuvius as its most prominent feature.

Extinct volcanoes, on the other hand, must be distinguished from those that are in an active condition, or of which the fires are merely slumbering. In the case of these, *i.e.* the *extinct* volcanoes, the geological evidence proves that neither lava nor any other matter has issued from them during the whole of the modern period, or that within which the earth has been inhabited by its present races of being, whether of the vegetable or the animal kingdom. Yet they may present a perfect analogy to the seats of modern volcanic fire, in so far as external appearance is concerned. There are many hundreds of such mountains in the district of Auvergne, in central France, each with its proper crater, a perfect volcano in form, and with abundant evidence of igneous activity, though at a long distant epoch. But this and similar regions of ancient volcanic force have no connexion with the areas of *present* subterranean fire which we have traced in a preceding paper, and should be carefully distinguished from them.

Gay Lussac enumerated 163 active volcanoes, a number which is of course increased by every new display of volcanic force in the case of mountains whose fires have previously lain dormant. In the case of some volcanoes, the potency of the subterranean fire seems to be gradually diminishing, and its effects are limited to the issue of sulphureous and other gases, which are continually emitted from the crater. A volcanic mountain in this condition is termed a *solfatara*, a name derived from that of a nearly extinguished crater near Puzzuoli, on the shore of the bay of Naples.*

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* An instance (like that of the term "delta," originally applied only to the low tract inclosed by the arms of the Nile, towards their embouchure) of the extension of a geographical term from a special to a general sense. The solfatara, near Puzzuoli, appears to have been in nearly the same state before the Christian era as at the present time, giving vent only to aqueous vapours, with sulphureous and other gases.

Teneriffe and others of the Canary Islands, together with Stromboli, in the Lipari group, and some of the volcanic islands in the Greek Archipelago, are in the condition of solfataras.

The gases given out by volcanoes are muriatic acid, sulphur combined with oxygen or hydrogen, carbonic acid, and nitrogen; together with immense quantities of aqueous vapour.* Besides these, are a variety of ejected matter, comprising dense showers of ashes, with stones, masses of rock, and various substances comprehended under the term "scoriæ," and in many cases streams of lava. The aqueous and gaseous vapours produce that appearance of smoke which generally heralds an eruption, and the semblance of flame by which it is accompanied proceeds, probably, in most cases, from the clouds of red-hot ashes, aided by reflection (from the dense masses of vapour) of the glowing light emitted by the lava in the interior of the crater, which is literally a sea of liquid fire. In some instances, however, the seeming flames may be produced by the inflammable gases in a state of actual ignition.

The amazing force with which the ejected matter issues from a volcano, and the vast distances to which it is thrown, show how powerful is the cause to which volcanic phenomena are due, and combine with other considerations to point to some deeply-seated origin, of a nature analogous to those forces which have been put into operation in the general structure and movements of the planetary world. The ashes ejected from Tomboro (in the island of Sumbawa, one of the Lesser Sunda range), in the eruption of 1815, were carried on the side of Java to a distance of three hundred miles, and upwards of two hundred towards Celebes, in the opposite direction, in sufficient quantity to darken the air. The sound of the accompanying explosions was heard in Sumatra, at a direct distance of nine hundred and seventy geographical miles, and the cinders floating in the sea to the westward of that island formed a mass of two feet in thickness, and of many miles in extent.†

Of volcanic products, *lava* is unquestionably the most important; but its occurrence during an eruption is by no means uniform. No lava issues from the volcanoes of the Andes, though streams of it have flowed from some of the volcanic cones that rise above the Mexican plateau. Immense quantities of lava have repeatedly issued from the Icelandic volcanoes. Even in the case of Vesuvius, and other lava-emitting volcanoes, the ejection of lava is not a uniform accompaniment of the eruption. No lava issued from Vesuvius during the tremendous eruption, the first on record, of A.D. 79, when Pompeii and Herculaneum were destroyed. These cities were buried beneath the showers of ashes ejected from the crater of the mountain. The excavations of modern times have restored Pompeii to the light of day, after the lapse of seventeen centuries; and the attendant circumstances of the phenomenon which caused its destruction have been rendered familiar by the pen of a popular writer of the present age.

When first issuing from the mountain, the lava flows in a smooth but rapid torrent, in regular channels, and in a perfect state of fusion. But as it advances, and its stream widens, it speedily loses this smoothness of aspect, becoming a dense, viscous, and *semi-fluid* substance, easily deflected from its course by irregularities in the surface of the ground, and travelling onwards with a slow and steady motion. Bodies of even considerable weight (it has been found by experiment *), as stones weighing ten or fifteen pounds, make little or no impression on the surface of the stream, but larger masses of rock become slowly and gradually absorbed in the liquid mass. The front and sides of the lava-torrent present well-defined lines; their immediate contact with the atmosphere causes them to cool sooner than the central parts of the stream, and to consolidate earlier, while the more liquid portions flow over their hardening mass,—particular parts thus becoming heaped up in rocky waves. The entire body of the lava contracts as it parts slowly with its heat, and opens in numerous cracks and fissures, so that the tract over which a lava stream has flowed exhibits subsequently a broken, rugged, and blackened aspect, irregular masses of the lava rock being mixed with heaps of cinders and other volcanic substances. But atmospheric influences gradually soften the more prominent features of the scene, and the disintegrated lava-torrent often becomes, in process of time, converted into a soil of more than ordinary fertility.

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* Daubeny: "A Description of Active and Extinct Volcanoes," &c. London, 1826.

† This eruption was, indeed, one of the most frightful on record. Out of a population of 12,000, only 26 individuals survived on the island. Great tracts of land were covered by lava. Violent whirlwinds occurred simultaneously, and created much damage. See the particulars in Sir Stamford Raffles' "History of Java," quoted by Lyell, Vol. II.

The mineral composition of lavas is various, and, according as different elements prevail in their composition, they are termed trachytic, basaltic, or by other designations. The substance called felspar predominates in most modern lavas: that called augite is also abundant. Hornblende is rare in modern lavas, though abundant in igneous rocks of more ancient origin. Quartz is also rarely exhibited in a separate form in recent lavas, though it forms so important an ingredient in granite and other rocks of igneous origin. The term *trap* is used by geologists to embrace all volcanic rocks of ancient origin, and is derived from the Swedish word for a step ("trappa"), from the fact that rocks of such a kind are often found in successive platforms, one above another. Trap rocks differ from lava in the fact of their having originated beneath the pressure of water, and their being intermixed with sedimentary deposits, while lava has issued directly from the mountain, and cooled under the influence of the atmosphere; the mineral character of each is, however, essentially the same.

Torrents of water and mud often sweep down the mountain side during an eruption, and not unfrequently cause as much devastation to the fields and gardens around as the more common and characteristic products of the igneous agency. These are no doubt frequently (probably in the great majority of cases) derived from the sudden condensation of aqueous vapour, as it rises into the higher and colder regions of the air. Sometimes, also, the sudden melting of the snows that have gathered around the mountain's summit during its intervals of repose produces a similar result. Frequent instances of the latter kind have been known to occur among the volcanoes of the Andes, many of which, Cotopaxi amongst the number, rise high above the snow line, and exhibit ordinarily a glittering and icy covering. But in some instances there is no doubt that water is amongst the ejected products of the volcano, and with it thousands of small fish, that have lived within the subterranean reservoirs of the mountain. Amongst the mountains of Central America, there is one called the Volcan de Agua, or Water Volcano, from which streams of water are alone ejected.

The phenomena of submarine eruptions possess a striking interest, especially when they result, as has sometimes been the case, in the sudden elevation of solid matter above the waters of a deep sea. A recent instance of this kind occurred in the Mediterranean, to the south-westward of Sicily, and at a distance of thirty miles from the coast of that island. At the end of June, 1831, slight shocks, as of an earthquake, were felt by a vessel passing over the spot indicated, followed (about a fortnight later) by a column of water rising to sixty feet above the sea, with dense clouds of vapour. This was shortly succeeded by the appearance of a small island, twelve feet high, with a crater in its centre, whence volcanic matter and vapour were continually ejected, while the sea around was covered with floating cinders. The eruption continued for some weeks with great violence, the size of the island constantly increasing by the accumulation of the newly ejected matter. At one period it had attained its maximum dimensions of three miles in circumference, and more than two hundred feet in height. It afterwards gradually diminished, the loose volcanic matter being washed away by the waves. By the end of October, the island was nearly levelled with the surface of the sea, and afterwards wholly disappeared, leaving, however, where there had formerly been a depth of more than a hundred fathoms, a dangerous reef, composed of solid rock (most probably lava), a permanent addition to the hydrography of the tideless Mediterranean*.

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* See Lyell, Vol. II.

Several similar cases are on record in other localities, as in the neighbourhood of the Azores, off the coast of Iceland, and among the Aleutian Islands. A peculiar agitation of the waters of the ocean, as by some powerful force beneath, and quite distinct from the kind of movement due to atmospheric influences, is indeed by no means uncommon in the experience of mariners, and is often followed by the issue of smoke and gaseous matter above the surface of the water. A particular part of the Atlantic Ocean, in the neighbourhood of the equator, has been noticed as a locality in which such phenomena are of more than ordinary frequency.

There appears reason to regard the high temperature of most (if not all) thermal waters as derived from those conditions of permanent heat which prevail in the earth's interior, and to which reference has been made in a former paper. Hence they become, in some degree, connected with volcanic phenomena. The connexion is the more obvious in the case of the intermittent hot springs of Iceland, the well-known *geysers*. At irregular intervals (rarely exceeding twenty-four hours at a time) the geysers throw up columns of boiling water and steam. In the case of the great geyser (as the principal fountain is called) the column of water is ejected to the height of from one to two hundred feet, accompanied by subterranean noises and loud explosions, while sometimes the earth is slightly shaken during the occurrence of the phenomenon. If stones are thrown into the crater, or circular mound out of which the fountain rises, they are instantly ejected with amazing force. The geysers rarely play for more than a few minutes at a time. In the intervals between its eruptions the basin of the principal fountain is sometimes empty, but is more frequently filled with water in a state of ebullition.

In the case of the geysers, there is no doubt that steam is the immediate cause of the phenomena which are exhibited. They occur amongst a thick bed of lava, in the south-western part of the island, and at a distance of about thirty miles from Mount Hecla. In this district, the rushing of water beneath the ground is frequently heard; and the streams, as in similar cases elsewhere, flow in subterranean channels through the cavernous lava.*

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* The name of Graham Island was one among several appellations that were given to this volcanic islet during the period of its brief existence, and has been that most generally recognized.—See Lyell.

We have spoken of the various forms in which the subterranean heat of our globe exhibits its agency in sudden and violent disturbances of the surface, and in phenomena of irregular recurrence. It remains to notice one mode of action (to be classed amongst volcanic phenomena) by which changes of a slower and less easily obvious character are produced, namely, the gradual rise and subsidence of large tracts of land. Careful observation has shown, beyond the reach of doubt, that a large portion of Sweden, extending from the coast of the Cattegat, above Gottenburg, on one side, to the head of the Gulf of Bothnia on the other, is slowly rising to a higher level above the adjacent sea, at the rate of about forty inches in a century. The proofs are derived from the altered depth of the harbours at successive periods, the changed position of various marks along the line of coast, the presence, at a distance inland, and at some elevation above the water, of shells identical with those now living in the Baltic, together with other circumstances of a like kind. It was once supposed that these alterations were due to a gradual sinking of the adjoining sea; and indeed it is obvious that they can only be caused by one or the other circumstance—a rise of land, or a depression of the sea-level. But the latter hypothesis, as is now universally admitted, is absurd, since the Baltic communicates with the open ocean, and there can of course be no sinking of any one part of the ocean which would not equally affect every portion of it. Either the whole of the watery portion of the earth's covering must attain an altered level, or none of it. With the land the case is widely different; and there can be no doubt that its gradual rise explains the observed phenomena in the case here adverted to. In some parts of Scandinavia, indeed, there seem to be evidences of a successive rise and fall of particular portions of land. Similar alternations of level are also proved to have occurred elsewhere; but the rise of land in the Scandinavian peninsula becomes the more noticeable from its occurrence in a region far removed from any of the ordidary displays of volcanic force†.

In some parts of the globe, on the other hand, there is evidence of a gradual sinking of tracts that were formerly more elevated; and the one kind of action, in all probability, balances the other, so as to preserve a general equilibrium in the mean elevation of the solid portion of our planet's surface. According to the theory proposed by Mr. Darwin, to account for the various characteristics of coral reefs, in reference to their shapes and the different relations which they bear to adjoining coasts, many of the coral islands of Polynesia and elsewhere indicate regions of gradual subsidence. And this theory is rendered the more probable by the well-known prevalence of igneous forces in the bed of the Pacific and around its shores‡.

The phenomena referred to in these papers result in the production of considerable changes in the aspect of extensive regions, in the comparative altitude of adjacent tracts, and (not unfrequently) in the relative position of land and sea. Whole tracts of country sink beneath the water's level, and others rise above its surface. The changes here described are due to igneous causes, that is, to the deeply-seated action of subterranean fire. Changes of a like kind, and of even a more extensive character, result from aqueous phenomena, and are produced by the gradual and constant operation of the sea, or of running streams, upon the adjacent land. The sea and the land change places, and the former (as is justly remarked by the distinguished geologist to whom we have so often referred) is in reality the more enduring of the two, and constitutes the fitter emblem of eternity.

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* See Lyell (Vol. II. pp. 334—337) for a probable explanation of the intermittent action of the geysers.

† See Lyell, Vol. II. pp. 286—306; also, *Ib.* p. 267, *et seq.*

‡ The Structure and Distribution of Coral Reefs. By Charles Darwin, M.A., F.R.S., &c. London: 1841.

The full importance of the results produced by natural causes in constant operation is only appreciated when their amount is measured by reference to a lengthened period of time, embracing several successive centuries. But even estimated by this measure of a single generation, they are often by no means unimportant, and we trust enough has been said to show that they involve considerations of no ordinary interest. We believe that such topics as have here been glanced at are deserving of fuller attention than has hitherto been given to them in our schools. Physical geography is only rightly taught when it is viewed in connexion with physical *geology*. It is not enough to describe merely the surface of the earth; the geographer, to be worthy of the name, must look also beneath the surface (as, in the opposite direction, he extends his inquiries into the regions of atmospheric space), if he would rightly appreciate the operation of those various laws which result in the production of climatic differences, and which exert a controlling power over the forms of organic being. In either direction, he will find abundant materials for admiration, awe, and reverential homage.

W. H.

ON THE MANAGEMENT OF CHILDREN, WITH REFERENCE TO THEIR MORAL AND INTELLECTUAL CULTURE.

(*Continued from p.* 263.)

It has been shown that in early infancy the rudiments of all future intellectual powers are in existence; that they are pliable in their nature, governed in their development by the nature of the impressions made upon them, influenced by the examples presented for their imitation, and that they possess the same properties and are susceptible of the same characteristics as are manifested by the human being in maturer age. Now, although the natural senses—seeing, hearing, taste, smell, and touch—which are the means of communication with the external world, and the mental faculties—emotion, perception, thought, attention and memory—which arise from the exercise of the natural senses, are essentially the same in all, still some of them are developed much sooner, and in a more perfect state than others; and each individual sense or perception acquires power and distinctness in proportion to the exercise to which it is subjected, and the advance of the organs necessary for its elimination towards maturity. Neither the external senses, nor the moral and intellectual faculties are all equally developed at the same time. In some instances the cultivation of one sense or faculty is necessary for the development of another. For instance, sight informs us of the colour, form, and distance of an object, but another sense is required to distinguish whether its surface be rough or smooth, whether its state be cold or hot, or whether its nature be heavy or light; the combination of these two senses gives a correct perception of the object, and this perception becomes matured into an idea. From this natural and distinct dependance of each of the senses upon the relative condition and constitution of its own special organ, there arise two important considerations, to be remembered in the attempt to develop and direct their manifestations. The one is, that as the different internal faculties are the result of impressions conveyed to the brain by the exercise of the different organs of sense, one or more of them may be more mature and capable of cultivation than the rest. The other is, that the proper way to exercise any one of them, so as to lead to a true and definite perception of the object presented, is to observe that such an object shall be one in its nature appropriate to the sense upon which it is intended to act; bearing in mind that all the organs of sense are as yet extremely delicate and easily overtaxed. The eye and ear by gentle and repeated exercise may be cultivated to quick and accurate perception, enfeebled and rendered slow and imperfect by inaction, and disordered or rendered callous by sudden or violent impressions. In the same manner the feelings, affections, and intellectual powers of the child may be modified in strength, rapidity, and precision of action by proper and habitual use, or be rendered feeble and inaccurate by indolence and unrestricted application—as in ourselves so in the infant, the proper exercise of any faculty is a source of pleasure, but one man will find enjoyment in the exercise of one faculty, and consequently cultivate it more, and another man will derive the same amount of pleasure from a different pursuit. Let this fact be borne in mind in the moral and intellectual training of the young. Much harm has been done and much real and unnecessary cruelty been inflicted by the bigoted notions of some parents. They say, "My children shall be so and so; from their infancy they shall think so and so; and if they do not appear to fall into my ways and ideas, I will make them do so;" quite forgetting that this very stamp of character in themselves unfits them completely for the education of infancy or the direction of boyhood. They cannot make up their minds to allow nature to do anything*. We may modify the mental faculties of the child as they present themselves; we may cultivate the one by presenting objects and ideas repeatedly to its notice, and may to a certain extent hold another in abeyance by withdrawing it from the power of example and avoiding the natural stimulus of that faculty, but we can neither change nor create. It is possible, either by kindness or by the exercise of brute force, to render a wild animal to a certain degree tractable, and it will remain so so long as a certain system of kindness or coercion is persevered in without exposing it to the influence of anything calculated to arouse the natural impulses of its savage nature; but we cannot substitute an assumed gentleness for a natural and instinctive ferocity any more than we can change the colour of its skin or the nature of its food.

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* A most lamentable case of this kind has for some years been under our notice. A "holder forth" among one of the most-bigoted, and now fortunately least numerous body of dissenters, would never allow his child (a fine promising boy, who has now asserted and maintained his position among men) to indulge in any childish amusement or associate with children of his own age. Every thing was to be conducted according to his fixed rule, and his child was taught that all amusements were wicked and sinful; such awful descriptions of the devil and fire, and torment, used to be repeatedly presented to his notice, that he dared not to go to bed without a candle, and used to bury his head in the bedclothes as soon as he was left alone. These fears his father taught him (at the early age of six years ! !) were the effects of a bad conscience. After a time, however, the boy observed that his father was constantly scolding, and sometimes beating his mother, and quarreling with all about him; and my informant has often stated that this perplexing and inconsistent conduct had such an effect on his mind that at one time it required an effort to preserve him from the influence of atheistical principles. Fortunately he had the advantage of a mother possessing a well-balanced mind and a forbearing disposition, and at an early age was removed beyond the influence of the bad examples mentioned. He is now a useful and consistent member of the Church of England.

The development of the human faculties and the formation of character take place according to fixed rules imposed by the Creator for the regulation both of mind and body; and it is only by attention to the condition under which any organ or function is intended to act, that we can modify or improve its action. We cannot alter the nature or function of any organ, either of external sense or mental perception. In the education of the young this principle should always be before us. It is indispensable for our success, and it will save much useless labour and prevent the display of unnecessary authority. We must adapt our means to the nature of the being to be educated, and, as the mental powers are not all developed at once, we must apply to the best purpose those that are already manifested, and check, or endeavour never to call into exercise, any one of them that is not in accordance with strict morality or will not conduce to future good, until some more mature faculty of the mind is eliminated to modify it or act as its antagonist. If we thus employ the means in our power so that they may be in perfect harmony with the laws of the mental constitution under our care, these laws may be made the apt instruments to assist us in attaining the result we seek. We cannot make these laws ourselves; and that parent will soon lose the duty and affection due to him from his offspring who endeavours to coerce and mould a tender infant mind to a certain line of conduct, for which nature has never given him the capabilities or fitted him to practise. If we attempt to train the mind and direct the education to the attainment of only one object, or with a view to only one future pursuit, to the exclusion of all other impressions either of a useful or amusing nature, we lay the foundation of a narrow, selfish character, and destroy many means of happiness, improvement, and success. For instance, a worldly-minded parent, whose sole aim in life is the acquisition of wealth, teaches his child from its earliest infancy what he in his purse-proud ignorance calls the "value of money;" and instead of cultivating his moral faculties and teaching him that all his comforts are ministered to and his wants supplied by the great Father of all, he sets up a golden image for his household god; and what is the sad consequence? the child's character soon becomes a base compound of acquisitiveness and meanness—the only superiority he seeks is in the possession of something unattainable by others—and, not being taught the moral difference between right and wrong, and the duties he owes to his fellow-creatures, he soon practises any vice, or even commits crime, if by these means he can gratify his grasping desires. No social virtues having been inculcated, and no feelings of justice, kindness, and consideration for others having been developed in him, he passes his early life without gaining the respect of any of his associates, and eventually looks upon the authors of his being only as fit objects to minister to his vicious propensities, and to increase his wealth by their death. Dickens's "Jonas Chuzzlewit" is an excellent sketch of a character of this kind.

How often do we hear men talking as though it were as easy to implant or eradicate any quality of the mind as to remove a weed or plant a flower! but the fir-tree *will* grow in a rocky soil, and the vine *will* flourish in a rich and cultivated ground. But yet, while endeavouring to avoid the evils arising from attempts to force the infant mind by severity and the unlimited exercise of a power superior to its own to assume a certain form and development, we must not run into the other extreme. If a child finds himself unceasingly the object of the attention of those around him, and is allowed to direct his attention and have his wants supplied indiscriminately, he soon begins to look upon his attendants as the proper objects to minister to his wants, and the feeble efforts he makes to find enjoyment in the exercise of his own faculties are not sufficiently persevered in to lead to their independent development. To yield everything to his wishes, and to remove the necessity of his making any exertion to assist himself, is laying an early foundation for self-esteem, and neglecting the opportunity of fostering that faculty which, governed by moral principles, is one of the most useful in after life, that of self-reliance.

By nature a child is not generally selfish and exacting; it soon knows its own feebleness, and how dependant it is upon the kind offices of others, until its mental and physical powers become more developed; but, still, if assistance is afforded too long, or if a child is left to its own exertions too soon, these functions are but imperfectly displayed. For instance, a child will not attempt to acquire the power of walking alone if it is never encouraged to do so, or its feet not allowed to touch the ground; and, on the other hand, if it is made to attempt this exercise without assistance, and before its limbs are sufficiently matured, it either fails in the attempt or else its legs become deformed and its gait unstable. The same rule applies to mental training. If at a too early period we call upon the mind for exertions or manifestations which it is not sufficiently matured to make, these exertions are either not made at all or else are but imperfect, and the ideas obtained from perceptions thus forced upon the attention are rude and incorrect; and if, on the other hand, we minister to every caprice, and do not allow the mental faculties any means of independent action, the child remains in ignorance of its own capabilities, and becomes sluggish and inactive. If parents will from an early age exercise a mild and salutary control over the manifestations of all morbid and selfish desires, avoid all means of exciting them, never allow their gratification to be manifested by others in their children's presence, steadily oppose those influences which they feel to be wrong, and yet at the same time allow and join in every proper enjoyment and amusement cheerfully and heartily, their offspring will not only soon repay them with a rich return of affection, kindness, and reverence, but will also manifest a feeling of confidence and reliance on their judgment which will continue and strengthen in after years. The amount of confidence reposed in their parents by children when they are verging into manhood and in after life, is a striking and faithful indication of the treatment they have experienced when young. The sensibilities of children are remarkably acute. It is useless, nay, worse than useless, to exhibit an example and to endeavour to instil a precept; the very reverse of it; they are more prone to imitate acts than to follow verbal instructions and exhortations; and (as has been said before) whatever you wish those under your care to be, you must be before them. And those who have the guidance and instruction of the young must not themselves be above instruction; the child often administers a silent and useful lesson to the man. If the imitation of any of our acts or conduct by the child does not appear pleasing and conducive to good, we must first correct ourselves and exercise the more mature judgment of which we are possessed before we look for more correct manifestations in his conduct.

It is not sufficient to show children what their duties are, to inculcate certain sentiments of moral purity or mental perfection, and to teach them the performance of certain acts, but it is likewise essential to induce them to practise what we teach, to give them to understand the moral principles upon which our admonitions are founded, and so to order our own conduct that they may perceive the comfort and happiness arising from doing that which is right and avoiding that which is wrong. If, for instance, the children under our care see us exposed to circumstances calculated to vex and annoy, and observe how we bear them with equanimity and good temper, they will at once admire and respect our conduct, and, having witnessed the good effects of the self-possession and dignity of manner manifested in ourselves, it will be easy to teach them the advantages and practice of self-control. This is the manner in which to bring conviction to bear on the mind of the young; one prominent example, one practical exhibition of the principles we endeavour to inculcate, will have more effect and be longer remembered than any verbal explanation or persuasion. We cannot as yet depend upon the exercise of judgment or the perfect use of the reasoning powers; but if we make the conclusions we wish to impress on the mind self-evident, we reduce them to simple perceptions of cause and effect, and a child will remember an axiom before he can demonstrate a problem. The adaptation of examples and precepts calculated to make simple and distinct impressions on the minds of the young requires the exercise of some ingenuity and thought in those who are their instructors. We are obliged to analyse our own perceptions of things, and to present them in their most simple and elementary manner, and thus by the exercise of our own more matured mental powers we gain strength, find the means of applying the knowledge we possess, and render our own attainments of more value because more practical and less theoretical. If we feel an interest in that which we endeavour to convey to others, our duties as teachers, instead of being an irksome and tedious recurrence of every day tasks, become sources of pleasure and improvement to ourselves, and we have the additional gratification of success, for our interest is perceived and appreciated by those under our care, and "whatever comes from the heart goes to the heart again." Thus, then, it has been shown how easily the infant mind is influenced, how soon perceptions are received and ideas appropriated, and how the education of the young depends more upon the powers of imitation and the influence of example than upon the exercise of reason and judgment.

So much having been said about the moral and intellectual training of the young, and so much importance having been attached to the influence of example and the cultivation of each faculty by the presentation of the stimulus adapted to bring it into exercise, it may be inferred that much is dependant upon the disposition and mental culture of those to whom the care of the young is entrusted. This is indeed a most important and highly interesting consideration. We cannot impart that which we do not possess; an assumed conduct is soon discovered by the simple tact of the young; and those who would take credit to themselves for a mental superiority they do not possess, generally meet with contempt and disobedience. It has been before observed that the first part of the moral and intellectual training of the child devolves more especially upon the mother, and it is but in accordance with natural laws and the feelings inherent to her nature that this should be her special vocation. A good mother will undertake anything for the present happiness or future well-being of her offspring. In her labour of love she knows no toil or weariness; she hopes and perseveres under all difficulties and disappointments; no self-denial is felt as a deprivation, no exertion too arduous for her.

Observe the young wife who has but recently become a mother, with what a matronly air she conducts herself; her spirits may be as gay as in her laughing girlhood, but they are qualified by a calm serenity in their enjoyment; not that the pleasures in which she before indulged have lost their zest, but because pleasing emotions of a higher and more holy nature animate her; the nature of her disposition is not changed, but it has become more elevated and enlarged; her manner is not less pleasing and fascinating, but it is more cordial and sympathetic. If beforetime she was inclined to selfishness, she becomes considerate; if vain of herself, that vanity (and a pardonable and useful vanity it is) is transferred to her child; if her conduct has been frivolous, it becomes sedate without being dull; and if her temper has been peevish and fretful, it becomes gentle and kind. These moral changes are just as natural and as much ordained by that "Almighty Power that orders all things well" and "tempers the wind to the shorn lamb," as the changes which take place in her physical constitution previous to her becoming a mother. Thus we see how in all the works of nature and the dispensations of Providence the means are adapted to the end. But although the disposition and conduct of the mother is thus modified by the circumstances in which she is placed, still the evils of her previous education are often manifested, and in some instances become an insurmountable bar to the proper discharge of her duties. It is true that the iron law of necessity is slowly bringing the defects of female education into notice; but still prejudice, the conventional rules of polite society, and the ambition of many mothers with the charge of up-grown daughters, do, and perhaps ever will, oppose serious difficulties in the way of any practical reform in this matter. No one admires more, or feels greater enjoyment in observing, the practice of all refined and civilized accomplishments than we do; but we often find cause to regret that, in addition to these acquirements, there is not more of domestic education. The sex are not naturally vain and frivolous, as many sneering cynics would have us believe; their nature is in many points superior, and some of their faculties more elevated than our own. Their perceptions are vivid, memory retentive, aptness for the acquisition of knowledge developed early, and their moral powers more perfect and pure than our own; but these qualifications are too often neglected and hidden by that kind of culture which has been perpetuated and become almost necessary under the name of accomplishments and finished education. The natural kindness and generosity of a girl's disposition is often changed to selfishness and overweening vanity, and her inherent timidity replaced by an assumed superiority and love of admiration induced by the kind of education and the companions of her more youthful days.

Woman's real mission in this world commences after marriage. The happiness of her husband and children does not consist in the display of refined accomplishments, but in the exercise of household management and domestic virtues. We educate our sons so that at the age of manhood they may take their position as men of birth, professional men, or merchants; and we do so anxiously expecting that the preparation we have given them will fit them for the discharge of their various duties and make them useful members of society, when they are no longer under our control or dependant upon us. But we do not expect that because a young man is an excellent horseman, a finished example of the fencing-school, or a model of elegance and easy manners in the saloon and drawing-room, he must necessarily become a clever physician or a successful merchant. We have done well to invigorate his body and fit him for society by the acquisition of these accomplishments; but we rely upon his more solid attainments for future success and usefulness. Why not apply the same rules to female education? If the ornaments of education shine with a grace and elegance in the other sex, which it is not in our nature to attain, how pleasing and enchanting would those more useful and every-day acquirements appear which are necessary for the proper discharge of the duties of a wife and a mother?

In many instances a parent enters upon the important charge and culture of an immortal being, in whose existence and well-being her whole soul and happiness is centred, with less previous knowledge of her duties than if it were a plant or a flower. There are many women with natural sound sense and well-balanced minds, assisted by the moral changes which occur in their own constitutions previous to their becoming mothers, who discharge their duties in so admirable a manner, that it appears as though no previous education in these matters could have added anything to their efficiency; but still these examples do not militate against the general rule—the necessity for preliminary instruction. The slightest observance of the constitution of the world shows us that the position of woman is social, and her peculiar province the home circle. Her partner of life's joys and sorrows has to meet the busy world, to mingle in its cares and anxieties, to do his best to secure success, and to bear with equanimity the disappointments he meets with in his endeavours to obtain a comfortable subsistence; whilst upon the wife devolve the duties and comforts of his home and his children. To her the child looks in its helplessness for cherishing and affectionate care: she gives the sustenance it requires; to her all complaints of suffering are made: she watches its slumbers, regulates its exercise and amusement, and makes its happiness and comfort more than a part of her own. It has been before stated, and may be again repeated, that much of the stamp of character, and consequently much of the future happiness or misery of her children depends upon the disposition and mental powers of the mother; surely then it must be self-evident that her education and the qualifications necessary to fit her for her important office, as the protector and first teacher of the young, ought not to be neglected. The substantial and every-day happiness of the domestic circle must be of at least equal value with the light and fleeting hours of fashionable amusement, and to conduce to this end it will be admitted that female education should be so conducted as to fit both the mind and the body for the duties as well as the embellishments of life.

Next in importance to the mother in the care and education of the young comes the nurse, to whom, we are sorry to admit, that many of the duties incumbent on the mother are too often deputed. This delegation of duty arises in many instances from necessity, either from a want of the necessary knowledge, or from physical inability; but in other cases, it is to be feared, from indolence and self-indulgence. If affection and kindness were marketable commodities, and perseverance, self-denial, and good-nature as easily hired as thews and sinews, the choice of a nurse would require little discrimination, and not be attended with any anxiety; for although nurses are now much better educated in their duties, and more entitled to confidence and respect than they were, still they are only substitutes.

A nurse may have been the mother of a generation, but still they "were her own," possessed, in a great measure, of her own peculiarities, and brought up according to her ideas and prejudices. The child of a stranger is a stranger to her; its peculiarities are unknown, and the various external circumstances which surround both the parents and the child with whom she for the first time comes in contact are something new to her, and different from anything which she has experienced before. It generally happens when a nurse of this kind, without any preliminary education, relies entirely upon her own personal experience, that she shows the contamination of hurtful prejudices and superstitious observances. These nurses apply the same general rules to all cases—set at nought all useful suggestions, and triumphantly master all opposition by the assertion, "I have brought up a family myself, and so ought to know." Nurses, however, are to be found who are in some instances better educated for their own peculiar duties than many mothers are themselves. A nurse should not only be in the enjoyment of sound and robust health, but she ought to be of a cheerful and obliging disposition, and have a natural and innate liking for children. If she is not possessed of these moral qualities we cannot expect from her that persevering and patient kindness which no waywardness of temper can disturb, and which is essential to the proper and continued discharge of her duties. An irritable, passionate, and sour-tempered female is but ill adapted for these duties; for not only is it probable that she will maltreat the child during her paroxysm of passion, but it is almost sure to happen that a general system of mismanagement will ensue. All those little cheerful attentions and kind sympathies which are so pleasing to the infant and so conducive to its happiness and comfort will be neglected—there will be concealment practised towards the parents, and a child will become fretful and dull without any assignable cause. "The natural character of the nurse, indeed, makes such a difference in the manner of doing a thing, and consequently exercises such a direct influence on the welfare of the child, that the latter will sometimes be observed to pine under treatment which appears to a superficial observer the same as that under which it formerly throve." *

We may be unable to point out a single omission in the treatment required, yet in the *manner of conducting it* enlightened maternal affection may, on careful inquiry, discover a difference amply sufficient to account for the difference of effect. No watching or exhortation on the part of the parent can remedy a deficiency like this; and hence the only security against it is a right choice at first. We cannot, therefore, attach too much importance to moral character on the first selection of a nurse; for every change is attended with serious inconvenience; and when deceit is once practised confidence can never be restored. But when a good nurse is once secured, and the effects of her good, kind, and considerate services are evident in the cheerfulness and progress of the child, the mother can scarcely overrate her value, or habitually treat her with too much kindness or respect. But still, however fortunate we may be in the choice of a nurse, she must be looked upon rather as one to assist the mother in the discharge of her duties than to relieve her altogether from them.

The right-minded parent need not be again reminded how impressionable the infant mind is—how perceptions of manners and conduct are formed before language is sufficiently perfect to express them, or bodily development sufficiently advanced to manifest their effects. She will see how important it is, during the period of infancy, that her child should be surrounded by persons of refined intelligence and pure and elevated morality; and we are certain that when she considers the important charge committed to her care—remembers that the little being she dandles on her knee, whose first smile of intelligence makes her heart leap with joy, is an immortal, and will soon become an accountable being—she will feel convinced that she is guilty of a gross dereliction of duty, if she allows so important a trust to devolve entirely on the services of others.

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* Combe on Infancy, p. 223.

We have often witnessed as much kindness, self-denial, and attention on the part of nurses as can possibly be expected from any human being towards the offspring of another; and we must remember that many of the deficiencies with which nurses are frequently charged, are such as they have never had the means of remedying. Their former position in life, and the imperfect education consequent on that position, must be borne in mind; and it will not be right to overwhelm them with blame, or treat them with disrespect because, from their imperfect knowledge of the human constitution, they occasionally commit errors when they really and sincerely mean to do good. Mothers always "*mean well,*" but they cannot always "*do well;*" and we should not expect that perfection in others which even under more fortunate circumstances we do not possess ourselves.

Again; not only should the attendants of the young possess individually the qualities which have been mentioned, but a right feeling should also be manifested in their conduct to each other. Children can feel the effect of angry words and noisy altercations occurring in their presence, though not addressed to themselves. An unkind word or an unjust act will disturb the harmony of their susceptible minds, and make a painful impression, just as certainly as the eye will respond to the perception of light; because a feeling is always brought into exercise by the impression of the object which is the natural stimulus of that feeling, without any regard to its ultimate effect, or the reason why such an impression is made.

In many families, the charge of the young at an early age is committed to the care of that most intelligent but often neglected member of society, the governess; or, at least, where the younger members of a family are sufficiently numerous to require the services of one, the first cultivation of the infant mind generally becomes part of her duties, and in most instances she is admirably fitted for the task. It has often been observed that, under the influence of an intelligent female tutor, supported by the authority and respect of the parents, the most unruly children have been rendered considerate, and the dull stimulated to the acquisition of learning. Among those of tender age the peculiarities of her sex give her an advantage. She is naturally more prone to kindness than severity; can sympathize with the little distresses or difficulties of her charge; and is not so liable to the expression of impatience or rudeness of manner as those of the other sex. It has been said before that cheerfulness of manner is essential in those who have the care of children of tender age; but it is a difficult matter even to assume the appearance of cheerfulness when the mind is oppressed by a sense of contempt and neglect. It is with pain we say it, but alas! it is too true, that in many families, especially in the higher classes, the governess is treated as though she were an inferior being. With feelings as acute, affections as tender, education more useful and extensive, and judgment as sound as that of the parents who employ her, she is made, by a thousand petty annoyances, to feel that she "is only the governess;" as if she was not made of the same flesh and blood, or possessed the same moral and intellectual faculties as her more fortunate employers. If we do not treat her with respect, can we expect our children, who so readily catch the expression of our voice and imitate the manner of our conduct, to treat her with becoming obedience? or do we really wish our children to be trained by one whom, by our conduct, we teach them to regard as an inferior? Can we expect cheerfulness, ready invention, or general liveliness of manner, when we treat her unkindly, or rarely associate with her? She is too much superior to the household domestics to make them her companions; and if we treat her as though she were below our notice and confidence, then, indeed, hers is a dull and secluded lot. Under the most favourable circumstances, the governess has many difficulties to contend with. In many instances, from the over-indulgence of parents, the seeds of morbid propensities are sown, not easy to eradicate, and the most gentle attempt to restrain or modify the inclinations is met with petulance and ill-humour. By a steady perseverance, however, assisted, and, if necessary, mildly enforced, by the parents, much may be done. We cannot develop faculties of which the germs do not exist, any more than we can teach music to the deaf, or the nature of colours to the blind; but we may so modify those that have already developed themselves, that the good shall predominate over the evil, and the useful shall be cultivated, while the hurtful are kept in abeyance.

Notices of Books.

SELECT POEMS OF PRIOR AND SWIFT. Pp. 184. (London: *John W. Parker.*)

THESE poems are selected by the same hand as the extracts from Dryden, which we noticed last November. A perfect acquaintance with the authors and a just appreciation of their respective merits are as apparent in this publication as in the former one. It is remarked in the preface to Prior, that the selections from him are made upon a different principle to those from Dryden, although both poets require abridgment, and for nearly the same reasons. Many of the best productions of Prior are quite short pieces, whereas there is hardly anything of this in Dryden. Hence, instead of extracts, as in the case of Dryden, entire pieces are for the most part here selected from Prior. Lightness and airiness with extreme sweetness are his characteristics. Coming between Dryden and Pope, the situation which he occupies in the history of literature as a writer is peculiarly interesting, as regards both style and metre. He was a great follower of the French, and in some pieces, as in his imitation of Adrian's verses to his soul, he rivals them in elegance and lightness. He has none of Dryden's elevation of mind or manliness of spirit. As compared with Swift, in his lighter pieces, he is less hard and exact, but more easy, natural, and pleasant.

In the preface to Swift, that writer is justly considered devoid of poetical feeling in its proper sense, which indeed he professedly despised, and avoided every appearance of. His verses must be rather compared to those of Butler than to those of such a poet as Dryden. He possessed inventive fancy in the way of wit and of circumstances to compare or heighten an entertaining idea; but the fancy which produces rich, pleasing, or entertaining imagery, he hardly ever shows. His merit in his best works is the unrivalled power of producing and expressing in verse, just, characteristic, amusing circumstances of common life, and, above all, of conversation, sometimes most unaffectedly conveying the sharpest satire. Such are some of the remarks with which the selection from Swift is introduced, where, without having to wade through what is uninteresting, the reader will find ready to his hand specimens such as that "On the Death of Dr. Swift," the very best of their kind. Although the volume is but small, it is a valuable contribution to our popular literature, and cannot fail of being so esteemed by all those who are fortunate enough to become acquainted with it. The skill and discrimination with which the pieces are selected, and the critical taste shown in the short prefaces, render it not only very instructive to students, but also an extremely useful appendage to the complete works of the original authors.

SCHOOLS AND OTHER SIMILAR INSTITUTIONS FOR THE INDUSTRIAL CLASSES. BY REV. R. DAWES, DEAN OF HEREFORD. Pp. 48. (London: *Groombridge.*)

HINTS FOR THE ESTABLISHMENT OF PUBLIC INDUSTRIAL SCHOOLS FOR THE WORKING CLASSES. BY REV. J. SEDGWICK. Pp. 27. (London: *Rivingtons.*)

DEAN Dawes's pamphlet is the substance of a paper read before the Society of Arts, on the importance of giving as far as possible a self-supporting character to schools for the industrial classes, and the means of doing so. Its great value is, that it is limited to those points upon which the Dean can bring his own experience to bear, as well as that of other practical men engaged in the work of education, whose testimony he considers worthy of attention. The pamphlet is too full of information to admit of being further condensed. We must therefore be content with recommending the careful perusal of it, and only pointing out the particular objects of the author as stated by himself. His aim, it appears, was from the first to unite in the same school the children of the labouring classes and those of their employers, being persuaded that the only means by which the children of the latter in the rural districts are likely to get an education equal to their wants, is by bringing it home to them at a cheap rate; and that if this be done, they will in the end gladly avail themselves of it, notwithstanding any prejudice against the mixture of classes which may at present prevail. This union of classes he considered also necessary to give the plan any chance of success. In his pamphlet he shows that, as far as his own experience goes, the result has proved in a most convincing manner that where the instruction is good, and such as to meet the requirements of the parish and neighbourhood, all difficulties may be overcome. Having stated the facts connected with his own experience and with that of other practical men, he leaves the reader to judge for himself what these facts are worth, and how far they can be a guide to others in attempting to establish schools in the districts in which they are interested; but he expresses it as his own conviction with respect to agricultural districts, that, generally speaking, unless the children of employers and employed can be brought together in the same school, little will be done, and that it will be impossible to support good schools for the separate classes. He considers, therefore, that whether the farmers and the great body of the employers of agricultural labour are to remain behind the rest of the community in the matter of education, or to obtain an education suited to their station, depends mainly on our being able to establish good schools, in which these separate classes can be taught together.

Unlike Dean Dawes, Mr. Sedgwick does not even profess to found his Hints respecting the establishment of public industrial schools upon experience, or even to go into the details of any plan. He contents himself with expressing an opinion that the children of the poor might receive a sound industrial and general education in great public boarding-schools, set apart for that purpose, and then he briefly enumerates the advantages which he believes would be gained by their establishment. The obvious impracticability of such a scheme renders any further notice of it unnecessary. Its bare mention may be of service, if the wisdom of being guided mainly by experience in all matters relating to education thereby gains an additional illustration.

"LITTLE THINGS," (pp. 71.) "THINGS TO BE THOUGHT OF: ADDRESSED TO THE YOUNG." BY THE AUTHORESS OF "LITTLE THINGS," (pp. 96.) (Edinburgh: *W. B. Kennedy*. London: *Hamilton and Adams*.)

THESE little works are both highly deserving of recommendation, especially to the young of the middle and upper classes. The first of them has already reached a seventh impression of five thousand, and is therefore probably known to not a few of our readers. In their case it will be a sufficient recommendation of the second, to see that it is by the same authoress. For the sake of others, however, it may be well to state, that the professed design of the writer of "Little Things" is to show that things are not trifles that are called so; and that as little things may have great consequences, they are well worth attending to. It is wisely remarked, that as in the adorning of the person, or the decoration of a room, it is the little finishing touches that give elegance and grace; so in the adorning of our profession as Christians, it is the little things that make or mar the beauty of holiness. This is exemplified under the heads of little duties, little kindnesses, little efforts, little cares, little pleasures, and little sins. Of little duties it is truly said, that much of the irksomeness and worry sometimes attendant on them would be lessened or removed were they performed punctually and methodically, all things kept in their proper place, and all things done at the proper time. The duty of being always in a good humour is beautifully compared to the soft balmy air and bright sunshine of a summer's morn, which, when we feel and breathe, we think no other enjoyment can equal, without which the finest landscape wants a charm, and with which the dreariest moorland is bright and beautiful. Under little kindnesses we read, that life affords but few opportunities of doing great services for others; but there is scarcely an hour of the day that does not afford us an opportunity of performing some little, it may be unnoticed, service. Such are some of the wise and amiable suggestions to be found in "Little Things." Nor are "Things to be thought of" less fruitful in what is pleasing and instructive. This little book opens with reminding the young who, having left school, are henceforth in some degree to be their own mistresses, that their education is not finished, but rather about to begin; and that the next few years of their lives are to them of the most vital importance. Earnestness is pointed out as the most hopeful mood of mind for carrying on the great work of self-improvement; and it is remarked that the plan generally found available in our endeavours to do earnestly whatever we are about, is to fix times for what we have to do, as well as the things to be done in those times. Such a system must embrace others as well as ourselves; and this will not prevent our having abundant leisure for our own pursuits, for it may be observed, adds the writer, that it is not only the best-humoured, but the most industrious member of a family, that has time to attend to all the rest, and to whom, indeed, all the rest somehow get a habit of appealing for help. The power of usefulness, like all God's gifts, increases by exercise.

It is in the spirit and tone observable in these remarks that the authoress writes on the subjects of completeness of character, diligence, influence, and wandering thoughts, after having first very ably considered and answered the question, "What do you live for?"

CARPENTER'S SPELLING ASSISTANT. EDITED BY WALTER M'LEOD, F.R.G.S. (London: *Longmans & Co.* 1853.)

It is to be regretted that, as a consequence of teaching large numbers *en masse* in our Day Schools, Spelling Assistants have, to a great extent, been discarded under the plea that they are superseded by the improved nature of reading-books, and the introduction of dictation lessons. While, however, it must be acknowledged that elementary reading-books have made some progress towards presenting a graduated course of instruction, the attempt to displace the spelling-book by introducing explanations of a few of the more difficult words at the head of the lesson has in practice proved a failure. A reaction is now apparent; and the reinstatement of the Spelling Assistant, as one of the regular school books, is becoming every day more certain. The additions and improvements Mr. McLeod has made to Carpenter's Spelling are such as to make it very acceptable to both teacher and pupil; but it can scarcely be expected that it will displace old editions of this and similar books which can be procured at half the price. In all schools a step in advance of the poorest, it may be used with great advantage, and without meeting with the same obstacle to its introduction.

DESCRIPTIONS OF CANAAN, BEING AN ACCOUNT OF THE MOUNTAINS, RIVERS, AND TOWNS OF THE HOLY LAND. BY THE REV. CHARLES P. WILBRAHAM, VICAR OF AUDLEY. (London: *Parker.* 1853.)

The author of this little book has written it especially for the use of the young, in a style simple and likely to interest them. "The work," says the writer, "is the result of a personal survey of most of the places therein named; and one of its objects is to point out the remarkable testimony which the existing state of the Holy Land offers to the accuracy of the sacred Scriptures." The aim of the author, so far as intention goes, is unexceptionable; and his little book should find a place in all school libraries. But we do not admit either the utility or necessity of seeking testimony to the accuracy of Scripture for the young. It is only after the mind falls under counteracting influences, that testimony is looked for. The child delights in illustration; but if given in the form of evidence, it is likely to insinuate doubts. The first symptoms of a looking for other evidence than the Scripture itself is an indication of injudicious teaching; is a proof that a seed has been sown, and is germinating, which it may be impossible to uproot.

Hence it is, that in such narratives as the following, we think it injudicious to use the facts as anything more than illustrations. A child's implicit confidence, as the result of its simple truthfulness, should not be shaken by this addition to the narrative, "The Dead Sea is an argument of great power against the infidel."

"THE DEAD SEA.

"The buoyancy of this salt sea causes the human body to float without effort; and the traveller, on emerging from this lake, finds himself encrusted with salt; a fact of natural history which throws light on the doom of Lot's wife; who, lingering in her flight, was overtaken by the storm."

SCIENTIFIC DIALOGUES; INTENDED FOR THE INSTRUCTION AND ENTERTAINMENT OF YOUNG PEOPLE. BY THE REV. JEREMIAH JOYCE. A NEW EDITION, CONTAINING THE RECENT ADDITIONS TO SCIENCE. BY CHARLES V. WALKER, ESQ. (London: *Longmans & Co.* &c. 1853.)

THE long-standing popularity that this work has commanded is the best proof of its usefulness. It has become a sort of household companion, and outlived review. We adopt the sentiment of the editor of the present edition, and "hope that the young will derive as much pleasure and instruction from it as we remember to have derived in our boyish days." Of Mr. Walker's edition it may be said, that he has, without departing from the original plan of the author, made such alterations and improvements as to adapt it to the views and scientific discoveries of the present day.

THE FIRST BOOK OF GEOGRAPHY; SPECIALLY ADAPTED AS A TEXT-BOOK FOR BEGINNERS. BY HUGO REID. SECOND EDITION. (London: *Grant and Griffith.*)

THIS is a very useful epitome of geographical knowledge, and in the hands of a judicious teacher will become a valuable little school book. It is intended to be used by the pupil till he is of the age of twelve or thirteen years, when he will be able to undertake the study of more advanced works. As the compiler says, "He has studied to make a work suitable for beginners, by a proper *selection* from the vast body of geographical knowledge—he has taken time to write a *little book.*"

HYMNS AND THEIR TUNES. SELECTED FOR PUBLIC AND PRIVATE WORSHIP. (London: *George Bell.*)

THIS cheap little book is calculated to render great service to the practice of psalmody in private, and to become a valuable aid in the choral service of the church. The selection of the tunes and the adherence to recognised harmony are such, as fit it alike for the service of the church and for private use. The peculiarity of the collection consists in the arrangement of the tunes, according to their metres, with two appropriate hymns on the page opposite to the tune, so as to bring words and tune before the eye at the same time. Whilst we acknowledge the beauty and piety of sentiment in these hymns generally, we are doubtful about the policy of stereotyping certain hymns to certain tunes, and we believe an edition of the tunes separately would be more extensively useful and more generally acceptable. The book, however, in its present form is one that may, without hesitation, be recommended for the use of schools. It was originally prepared for the choir in the chapel of the Clapham Grammar School.

FABLES DE GAY, TRADUITES EN VERS FRANCAIS, PAR LE CHEVALIER DE CHATELAIN. (London: *Whittaker & Co.*, 1853.)

The editor of this volume has produced a spirited and sufficiently clear translation of the Fables of Gay. It will be useful in introducing Gay to the knowledge of his countrymen, but will hardly be adopted as a class-book for English schools so long as La Fontaine exists. It will be useful also to students of the language who are practising French composition, as showing how a well-educated native turns English phrases into good French.

Correspondence.

ON TEACHING ARITHMETIC.

Sir,—Next to religious knowledge, there is no subject of instruction in elementary schools, to which *more* attention should be given than arithmetic. For it is a necessary instrument in the transaction of the affairs of ordinary life, and, if properly taught, may be made a highly important means of mental discipline. Professor Moseley well calls it the "logic of the people," since through it the working-man's child may be trained into habits of concentrated attention and logical reasoning, and thus may reap some of the advantages which the children of the upper and middle classes derive from classical and mathematical training. In order that arithmetical teaching may produce these results, it must not be confined to the mechanism of calculation. Reasons must be given with rules—the children, rather, by careful training, must be led to prove the rules for themselves. There is scarcely a rule in arithmetic with which this may not be done, if the course be gradual, each step leading gently to something more difficult and complex. It will be found that the pupils may be led to prove most of the rules by a species of induction. The simplest example of the case being taken, they are brought to solve this by first principles, that is, by common-sense methods, without the aid of any rule; the same is done with several others, each being more difficult than the preceding. Their attention is then directed to some common feature in all the problems; they are led to see that the same method of solution prevails throughout, and readily to embody common principles in a rule. If it be thought that this extreme attention to demonstration, will leave but little time for ordinary counting, it must be considered, that in teaching arithmetic, it is not sought to make expert calculators merely, but to develop the mental energies, to train the powers of observation, reflection, and logical reasoning. Furthermore, it must be remembered, that what is learned mechanically is speedily forgotten, and that nothing so much assists in the recollection of rules as a knowledge of the principles on which they are based. But in order that, while the children are thus taught precepts intelligently, they may be able to apply these readily, considerable time must be given to the subject, and this time cannot be thought misspent, when it is considered that, besides being of immense importance in the practical affairs of life, there is nothing taught in our elementary schools more calculated to serve the purposes of the intellectual trainer than arithmetic. All that has been said above applies with peculiar force to mental arithmetic. Simple examples on this may be given to the child at the very beginning of his school career; he will thus be very much assisted in acquiring a knowledge of ordinary arithmetic. If he be conducted through a systematic course on the subject, embracing nothing but what is useful, either in its practical applications, or as an exercise, he will be ready for active occupation in the ordinary routine of business, whilst his mind will have been subject to a most wholesome discipline. In going though this course, each rule would be derived by the method of induction before mentioned, then formally stated, and sufficient examples given to render its application easy. To render this more intelligible, three common rules in mental calculation are here given, worked out in the way suggested, the first at full length, the others more briefly; the principal steps alone being indicated.

1. To find how much a certain sum per day amounts to in a year.

If I receive 1*d.* a-day, how many pence is that for 2 days? 3 days? 7 days? 100 days? How many for 365 days? for a year? How many pence in a shilling? a pound? At 1*d.* a-day, how much for 240 days? Then, at 1*d.* a-day, in 240 days, I should receive 240 *pence*,* or, 1 *pound.* If I receive 1*d.* every day in the year, for how many days have I got to receive money? At 1*d.* a-day, how much for 125 days? and 125*d.* are 10*s.* 5*d.*, 1*d.* more would make 10*s.* 6*d.* How many shillings in a guinea? In half-a-guinea? Should I ever receive 10*s.* 6*d.* additional? (Here the teacher should draw out that some years, which are called leap years, consist of 366 days, and that, therefore, in such, after receiving 1*l.* for 240 days, 10*s.* 6*d.* would be due for 126 days yet remaining). . . . Then in leap year altogether I should receive 1*l.* 10*s.* 6*d.*, that is, 1*l.* and half-a-guinea.

The work will stand on the board thus:—

1*d.* a-day,
for 240 days amounts to 240*d.* = 1*l.*
126 " " 126*d.* = 1 half guinea.
———
366 " " " " 1*l.* + 1 half guinea.

The teacher now proceeds—

If at 1*d.* a-day for 240 days, I receive 1*l*, at 2*d.* a-day for the same, I should receive 2*l.*; at 3*d.*, 4*d.*, &c. If at 1*d.* a-day for 126 days I receive 1 half guinea, at 2*d.* a-day for the same time I should receive 2 *half guineas*, at 3*d.* a-day 3 *half guineas*, &c.

The results for several different sums per day could be derived in this manner, and placed on the board in the same way as for 1*d.* The children would then be prepared to make their induction. By directing their attention to each separate result, the teacher can lead them to say, 1*d.* a-day for 366 days amounts to 1*l.*, and 1 *half guinea*, 2*d.* a-day to 2*l.* and 2 *half guineas*, 3*d.* a-day to 3*l.* and 3 *half guineas*, and so on. They would then be prepared to enunciate formally the rule. Take as many pounds and half as many guineas as there are pence per day, and this is the result for 366 days, or leap year; for a common year, *subtract* one day's allowance.

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* The children must supply the sums to the teacher's query.

2. To find the price of 100 articles, the price of one being expressed in farthings.

How many farthings in 1*d.*? in 1*s.*? in 2*s.*?

At 1*d.*, or 1 farthing each.
Cost of 96 = 96 farthings = 2*s.*
4 = 4 farthings = 0*s.* 1*d.*

100 = 2*s.* 1*d.*

At ½*d.*, or 2 farthings each.
Cost of 96 = 2 times cost at 1 farthing = 4*s.*
4 „ „ = 0*s.* 2*d.*

100 „ „ = 4*s.* 2*d.*

and so on. . . . . Whence the rule. Take the number of farthings in the price as pence, and double the number as shillings.

3. To find the interest of any number of pounds, for any number of months at five per cent. per annum.

Interest on 100*s.* for 12 months = 5*s.*
„ 20*s.* or 1*l.* „ = 1*s.*
„ 1*l.* for 1 month = 1*s.* 1*d.*
„ 2*l.* „ = 0*s.* 2*d.*
„ 3*l.* „ = 0*s.* 3*d.*, and so on.

Whence the rule: Take the pounds as pence for the interest of one month; then multiply by the number of months.

It is probable that this mode of treating the subject is practised by some of your readers. It cannot, I think, be doubted, that if it were more generally taught in this way, and if it occupied that prominent place in the school routine which such a method assumes, the effect would be most salutary. The pupils, while becoming expert calculators, would be daily trained to see the truth and beauty of mathematical reasoning, and the teacher would feel that he was thus preparing "for mature life not mere routine passive agents, but reasoners, and active men; sound, clear, conclusive reasoners, judicious, persevering, well-instructed, successful men."

J. B.

THE GENERAL SOLUTION OF A CUBIC EQUATION.

*By W. Rotherham, Esq., B.A., King's School, Sherborne, Dorset.**

I. Every cubic equation is represented by

$$x^3 + 3\,p\,x^2 + 3\,q\,x + r = 0 \quad . \quad . \quad . \quad . \quad . \quad . \qquad (1)$$

This can be reduced to the form $x^3 + 3\,d^2\,x^2 + 3\,d\,e\,x + e^2 = 0 \quad . \quad . \qquad (2)$

For put $x + h$ for x in (1); the transformed equation is

$$x^3 + 3\,(p + h)\,x^2 + 3\,(h^2 + 2\,p\,h + q)\,x + h^3 + 3\,p\,h^2 + 3\,q\,h + r = 0 \quad . \qquad (3)$$

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* Communicated by James Cockle, Esq., M. A., Barrister-at-Law. Mr. Cockle adds the following note:—

"This solution is, in substance, identical with that which I gave in the Cambridge Mathematical Journal for May, 1841. It was forwarded to me a few days ago by Mr. Rotherham, who, I believe, rediscovered it independently. Its neat and elegant analysis justly merits a permanent record.—Temple, 21st June, 1853."

Hence that the coefficients may have the required relation

$$(h^2 + 2\,p\,h + q)^2 = (h^3 + 3\,p\,h^2 + 3\,q\,h + r)\,(h + p)$$

$$\text{or } h^4 + 4\,p\,h^3 + 2\,q\,h^2 + 4\,p^2\,h^2 + 4\,p\,q\,h + q^2$$

$$= h^4 + 4\,p\,h^3 + 3\,q\,h^2 + 3\,p^2\,h^2 + 3\,p\,q\,h + r\,h + p\,r$$

Whence $(p^2 - q)\,h^2 + (p\,q - r)\,h + (q^2 - p\,r) = 0$

Let $p^2 - q = s, p\,q - r = 2\,t, \therefore q^2 - p\,r = p\,(p\,q - r) - q\,(p^2 - q) = 2\,p\,t - q\,s$

$$\therefore s\,h^2 + 2\,t\,h + 2\,p\,t - q\,s = 0;\ \text{whence } h, \text{ and}$$

$$\therefore s\,(h + p) = p\,s - t \pm \sqrt{t^2 - s\,(2\,p\,t - q\,s)}$$

$$= p\,s - t \pm \sqrt{(p\,s - t)^2 - s^3} \quad . \quad . \quad (4)$$

Let $h_1{}^3$, $h_2{}^3$ be these corresponding to double sign, $\therefore h_1 . h_2 = s$ . . (5)

II. Multiply (2) by $-e$, and add and subtract $d^3\,x^3$,

$$\therefore (d^3 - e)\,x^3 - (d^3\,x^3 + 3\,d^2\,e\,x^2 + 3\,d\,e^2\,x + e^3) = 0.$$

Let $\lambda^3 = d^3 - e$, then $\lambda^3\,x^3 - (dx + e)^3 = 0$.

If α be a cube root of unity $\lambda\,x\,\alpha = d\,x + e$

$$\therefore x = \frac{e}{\lambda\,\alpha - d} = \frac{d^3 - \lambda^3}{\lambda\,\alpha - d} = -\frac{d^3 - \lambda^3\,\alpha^3}{d - \lambda\,\alpha} = -(d^2 + d\,\lambda\,\alpha + \lambda^2\,\alpha^2),$$

which is a root of equ. (2). Increasing it by h

$$-(d^2 + d\,\lambda\,\alpha + \lambda^2\,\alpha^2) + (h + p) - p = -(p + d\,\lambda\,\alpha + \lambda^2\,\alpha^2)$$

is a root of original equ. (1).

III. To calculate λ. We have from (3), which is identical with (2),

$$\lambda^3 = d^3 - e = (p + h)^{\frac{3}{2}} - \frac{h^2 + 2\,p\,h + q}{(p + h)^{\frac{1}{2}}} = \frac{s}{(p + h)^{\frac{1}{2}}}$$

$$\therefore \lambda = \sqrt{\frac{s}{h_1}}, \text{ and } \therefore \text{by (5) } \lambda^2 = h_2;\ \text{also } d\,\lambda = \sqrt{\frac{h_1{}^3}{s}} . \sqrt{\frac{s}{h_1}} = h_1$$

$\therefore$ the root becomes $-(p + h_1\,\alpha + h_2\,\alpha^2)$.

If then α assume successively the three values of the cube root of unity this gives the 3 roots of given equ. (1).

ANSWERS TO THE MATHEMATICAL QUESTIONS.

Ques. 179.—*Proposed by Amicus.*

A and B can reap a field of wheat in m days, B and C in n days, and A can do p times as much as C in the same time; in what time can the three reap it together?

Answered by Mr. H. Blanchard, Mr. S. Dyer, Mr. E. Rutter, and Socius.

Let x be the number of days in which A alone can reap the field; then $\frac{1}{x}$ and $\frac{1}{p\,x}$ are the portions which A and C can respectively reap in a day; hence equating the portions, obtained from the first and second conditions, which B can reap in a day, we have

$$\frac{1}{m} - \frac{1}{x} = \frac{1}{n} - \frac{1}{p\,x};$$

$$\text{hence } \frac{1}{x} = \frac{(n - m)\,p}{m\,n\,(p - 1)} \text{ the portion which A can reap in a day,}$$

$$\frac{1}{m} - \frac{1}{x} = \frac{m\,p - n}{m\,n\,(p - 1)} \quad . \quad . \quad . \quad . \quad . \quad . \quad \text{B} \quad . \quad . \quad . \quad . \quad . \quad . \quad .$$

$$\text{and } \frac{1}{p\,x} = \frac{n - m}{m\,n\,(p - 1)} \quad . \quad . \quad . \quad . \quad . \quad . \quad \text{C} \quad . \quad . \quad . \quad . \quad . \quad . \quad .$$

the sum of these gives $\frac{np-m}{mn(p-1)}$ the portion which they can together reap in a day, and therefore the number of days in which they can together reap the whole is $\frac{mn(p-1)}{np-1}$.

QUES. 180.—*Proposed by Mr. W. H. Levy, Shalbourne.*

If O be the centre of the circle inscribed in the triangle A B C, then will

$$\frac{AO^2}{bc}+\frac{BO^2}{ac}+\frac{CO^2}{ab}=1.$$

Answered by Mr. J. Godward, Mr. Levy, and Mr. Wilkinson.

$$AO^2=\frac{r^2}{\sin^2\frac{1}{2}A}=\frac{(s-a)(s-b)(s-c)}{s}\;\frac{bc}{(s-b)(s-c)}=\frac{bc(s-a)}{s}$$

$$\therefore\frac{AO^2}{bc}=\frac{s-a}{s};\text{ similarly }\frac{BO^2}{ac}=\frac{s-b}{s},\text{ and }\frac{CO^2}{ab}=\frac{s-c}{s}.$$

$$\therefore\frac{AO^2}{bc}+\frac{BO^2}{ac}+\frac{CO^2}{ab}=\frac{3s-(a+b+c)}{s}=1$$

Mr. Levy adds the following property:—

If O_1, O_2, O_3, be the centres of the escribed circles, then will

$$\frac{bc}{AO_1^2}+\frac{ac}{BO_2^2}+\frac{ab}{CO_3^2}=1$$

$$\text{For }AO_1^2=\frac{r_1^2}{\sin^2\frac{1}{2}A}=\frac{s(s-b)(s-c)}{s-a}\cdot\frac{bc}{(s-b)(s-c)}=\frac{bcs}{s-a}$$

$$\therefore\frac{bc}{AO_1^2}=\frac{s-a}{s};\text{ similarly }\frac{ac}{BO_2^2}=\frac{s-b}{s},\text{ and }\frac{ab}{CO_3^2}=\frac{s-c}{s}$$

$$\therefore\frac{bc}{AO_1^2}+\frac{ac}{BO_2^2}+\frac{ab}{CO_3^2}=\frac{3s-(a+b+c)}{s}=1$$

From what is done above, it immediately follows that

$A\,O.\,AO_1=bc$, $B\,O.\,B\,O_2=ac$, and $C\,O.\,C\,O_3=ab$ (see Diary, 1843).

QUES. 181.—*Proposed by Mr. T. T. Wilkinson, Burnley.*

Let the sides C A, A B, B C of the triangle A B C be in arithmetical progression, O the centre of the inscribed circle, R, r the radii of the circumscribed and inscribed circles, and C K perpendicular to A B; prove that

$$AC-BC=\tfrac{1}{2}(AK-BK)$$
$$\text{and }AC.\,BC=6Rr=3\,CO^2.$$

Answered by Mr. W. Godward, A.M., Mr. Rutter, and A. G. P.

Since $AC^2-BC^2=CK^2=AK^2-BK^2$, we have $(AC+BC)(AC-BC)=(AK+BK)(AK-BK)=AB(AK-BK)$; but $AC+BC=2AB$, therefore $AC-BC=\frac{1}{2}(AK-BK)$.

Again, as $a + b = 2c$, we have $s = \frac{1}{2}(a + b + c) = \frac{3c}{2}$; therefore, by solution to last quest., $CO^2 = \frac{ab(s - c)}{s} = \frac{ab}{3}$, and (by Hann's Trig. art. 28) $Rr = \frac{abc}{4s} = \frac{ab}{6}$

$$\therefore AC.BC = ab = 6Rr = 3CO^2.$$

Ques. 182.—*Proposed by A. G. P., Herts.*

In a parabola of which the plane is vertical and axis horizontal, find the normal down which a body will descend in the least time.

Answered by Amicus, Mr. W. Godward, Mr. Levy, and A. G. P.

Let $4a$ = latus rectum of the parabola, x = abscissa A N, and t = time down normal P G; then by art. 222, Tate's Mechanical Philosophy,

$$t^2 = \frac{2PG}{g.\sin G} = \frac{2PG^2}{g.PN} = \frac{2}{g}\left(\frac{PN^2 + GN^2}{PN}\right) = \frac{4a(x + a)}{g\sqrt{ax}} = \frac{4a}{g}\left(\sqrt{\frac{x}{a}} + \sqrt{\frac{a}{x}}\right)$$

which is to be a *min.*, and $\therefore u = \frac{x}{a} + \frac{a}{x}$ = a *min.*; hence $\frac{du}{dx} = \frac{1}{a} - \frac{a}{x^2} = 0$, which gives $x = a$, and therefore the required normal may be drawn from either extremity of the latest rectum.

LIST OF MATHEMATICAL ANSWERS.

Amicus, ans. 181, 182; Henry Blanchard, Wimborne Minster, ans. 179; Samuel Dyer, Wanstead, ans. 179; John Godward, Chelsea, ans. 179, 180, 181; William Godward, jun., Chelsea, ans. 179, 180, 181, 182; W. H. Levy, Shalbourne, ans. 179, 180, 181, 182; James Lovell, Chatteris, ans. 179; A. M., ans. 179, 180, 181, 182; A. G. P., Herts, ans. 179, 180, 181, 182; E. Rutter, Sunderland, ans. 179, 180, 181, 182; Socius, ans. 179; and T. T. Wilkinson, Burnley, ans. 179, 180.

NEW QUESTIONS,

To be answered in our Number for September, 1853.

Ques. 183.—*Proposed by Amicus.*

$$\left.\begin{array}{l} \text{Given } x^3 - y^3 = x^2 + y^2 \\ \text{and } x^2 - y^2 = xy \end{array}\right\} \text{to find } x \text{ and } y.$$

Ques. 184.—*Proposed by N'Importe.*

Given the line bisecting one of the equal angles of an isosceles triangle, and terminating in the opposite side, and the line drawn from the extremity of this line parallel to the base and terminating in the other side, to construct the triangle.

Ques. 185.—*Proposed by Mr. W. H. Levy, Shalbourne.*

If the greatest cylinder be cut out of a given paraboloid, the greatest out of the remaining paraboloid, and the greatest again out of the next remaining paraboloid, &c., *ad infinitum;* then will the sum of all the cylinders so cut out be equal to two-thirds of the paraboloid. Required proof.

Ques. 186.—*Proposed by A. G. P., Herts.*

A ball of elasticity e, is let fall from a given point h, above an inclined plane; find the range on the inclined plane after resilition.

⁂ It is particularly requested that all mathematical contributions be forwarded, at *latest*, by the 20th of each month.

ON THE MANAGEMENT OF CHILDREN, WITH REFERENCE TO THEIR MORAL AND INTELLECTUAL CULTURE.

(*Continued from p.* 302.)

In many instances the care of boys, and their preparatory education, is committed to the private tutor; and therefore it will not be out of place to make a few remarks on his duties and qualifications. A tutor has in many things an advantage over the governess; he is a man; and if, in addition to a sound education, he possesses a proper feeling of self-respect and decision of character, he can command the esteem of his employers, and, in a firm and gentlemanly manner, can respectfully express his opinion in any case where the consideration due to his position and the exercise of his legitimate authority appears to be forgotten. It is not the most learned man, the best classical scholar, or the most abstruse mathematician, that is best adapted for this office. A thorough knowledge of the human constitution, an aptness to convey instruction in its most simple and elementary forms, a real liking for and interest in his vocation, and a paramount sense of the importance of the duties that devolve upon him, are qualities of more value than deep erudition. The tutor must remember that it is more his duty to form the mind, to mature the understanding, and to inculcate habits of attention and correct perception, than to teach his charge a certain number of acquirements, or to complete a certain routine of tasks. He must bear in mind that whatever is worth doing at all is worth doing well, and must not attempt to gratify the vanity of parents by the apparent proficiency of his charge in repeating tasks of which they do not understand one word. He must never quit an idea, a word, or a sentence, until his young pupil understands and is thoroughly acquainted with its meaning and effect. He will then be sure to remember it. One ray of light communicated to the understanding is of more value than a whole book committed to memory. In his walks, and in the every day occurrences of life, objects will present themselves, and circumstances will occur, which may be improved, and made the means of exemplifying the lessons and principles of the school-room, and thus a desire for the acquisition of information may be encouraged. We may depend upon it that boys of tender age gain more from verbal instruction than from books. A man speaks with more sympathy than he writes; and the tone of voice, expression of feature and gesture, convey meanings which are not to be expressed by words alone. Then, again, the tutor should possess moral courage,—a determination to do that which he feels to be his duty in spite of the foolish indulgence of parents, or the effects of previous bad impressions. He must be truthful in all his conduct; whatever he promises to do he must do; whatever he interdicts must never be practised. He will thus teach his pupil the value of strict veracity and firmness of purpose. The principle of love, respect, and consideration for all must be inculcated; and hence, the tutor must not speak disparagingly of others, or make their faults and deficiencies a matter of amusement or witticism. At a very early age, the idea of the existence of a superior being appears to be a natural and instinctive feeling,—a fact overlooked, or perhaps thought too trifling by those who, being wise above what is written in the Book of God or the book of nature, would degrade themselves by the belief that they spring from nothing, and are accountable to no one. Much use may be made of this feeling; upon its proper encouragement depends all moral excellency and all virtuous principles; and that tutor sadly mistakes his vocation who endeavours to attain intel -

lectual proficiency without the cultivation of a high standard of morality. The writer was very much struck with the expression of intelligence and proof of excellent training manifested by a pupil of the Deaf and Dumb Asylum in Doncaster, a boy about ten years of age. On being asked, by signs, " Who made you?" he uncovered his head, assumed a reverent expression of countenance, and with his open hand pointed upwards. There was a simple grandeur in the act never to be described or forgotten: a mental acknowledgment which no words could have more emphatically conveyed. Let any one open to conviction, who denies the existence of a God, or the intuitive perception of a Supreme Being, visit the noble establishment we have mentioned, observe the signs manifested by its unfortunate inmates, and the expression of their countenances when they are questioned as to the existence and nature of the Deity, and if he does not come away a wiser and a better man, we will adopt his principles ourselves. But to our subject. Although the " law of kindness " is the one upon which all attempts to educate those of tender age should be founded, still means must be found to enforce obedience where it is necessary. Much abuse has been made of corporal punishment; it has often been inflicted by tutors and parents in moments of passion and irritation, and in some instances has degenerated into the manifestation of a revengeful and vindictive feeling. The necessity for punishment of any kind may be to a considerable degree prevented, by endeavouring to let children feel that all we require from them are matters of duty, and conduce to their own comfort and happiness. They soon begin to know when they have done wrong, or broken a rule, and are unhappy; and if we punish for slight and perhaps unintentional offences, we offer inducements for concealment and untruth. An old writer very pithily says, " God is on the side of nature, whoever dreads punishment suffers it, and whoever deserves it dreads it ;" this remark is as applicable to the young as to those of more mature age. When the punishment of children becomes necessary it should consist rather in a deprivation of comforts and enjoyments than in the infliction of bodily pain. It certainly seems an anomaly to punish mental or moral faults by bodily impressions, and to apply the same means of coercion to a thinking being as we do to a brute. There are children so constituted as to remember and fear corporal punishment in a salutary manner, because their mental developments are so imperfect that their minds are not sufficiently impressionable, and in these cases much must be left to the discretion of those who are in authority over them. Still it must be admitted that physical pain or inconvenience is not so calculated to make an impression on or be remembered by an intelligent being, as the experience of mental deprivations and distresses.

But while endeavouring gradually to cultivate the various mental faculties of the young as they develop themselves, so as to prepare the mind for future and more systematic education, we must take care not to exact too much, or to tax these newly developed powers too far. At any period of life excessive and continued mental exercise is hurtful; but during infancy, when the structure of the brain is immature and imperfect, it is not only hurtful but positively injurious. We cannot force nature, her laws are as immutable as the Almighty being who gave them, and any attempt to frustrate or disturb their action is sure to meet with disappointment and to bring its own punishment. Many children, especially those of scrofulous constitution, are remarkable for the early development of their intellectual powers, and the precocity of their understanding; and it unfortunately happens that parents, pleased by the intelligence and aptitude shown by their children, frequently encourage their mental efforts, stimulate them by commendation, and, misled by the promise of early genius, look forward to the time when their cultivated talents shall display themselves with dazzling lustre, and be an honour to their name. It is with no little pain that we have witnessed instances of precocity of this kind, and known that the child whose mental manifestations so astonished us, and whose pertinent remarks and accurate perceptions so endeared it to all who observed them, was on the brink of disease. In these cases, exactly as the realization of the parents' hopes and anticipations appear to approach maturity, so in proportion the probabilities of their being so are dimmed. The prematurely developed, overtaxed, and morbidly excited brain soon begins to suffer, and either becomes the seat of positive disease or else loses its tone, leaving the mental powers dull and inactive for the rest of life. Children of this kind likewise suffer more from any of the incidental ailments to which their tender age is liable, than those in whom there is a childish mind with a childish body. That which in an ordinary child would be only a slight deviation from health, is in them attended with fever, headache, and other formidable symptoms. Dr. Brigham says, "Dangerous forms of scrofulous disease among children have repeatedly fallen under my observation, for which I could not account in any way than by supposing that the brain had been exercised at the expense of other parts of the system, and at a time of life when nature is endeavouring to perfect all the organs of the body; and after disease commenced I have seen with grief the influence of the same causes preventing or retarding recovery. I have seen several affecting and melancholy instances of children five or six years old, lingering awhile with diseases from which those less gifted readily recover, and at last dying, notwithstanding the utmost effort to restore them. During their sickness they constantly manifested a passion for books and mental excitement, and were admired for the maturity of their minds. This mental precocity results from an unnatural development of one organ of the body at the expense of the constitution."* Let us then guard against the mischief arising from the too early or over exercise of the mental faculties. Instead of taxing the infant brain, and endeavouring to impart knowledge by a series of tasks, or in a systematic form, let us rather cultivate the moral feelings, and endeavour so to mould the various mental manifestations as they come into existence, so that when both the mind and body are more fitted for exertion, there may be a readiness to receive and an aptness to appreciate the various branches of education which may be necessary to fit the child for his future position in life. Above all, it is important that the young should be trained and prompted to the exercise of their moral and intellectual powers by proper feelings and inducements, not by a system of rewards and punishments, or by coaxing at one time and compulsion at another. Perhaps there is no emotion of the mind which exercises so baneful an effect upon the child as fear, no matter whether it be brought into exercise by some sudden impression on the imagination, constituting "fright," or by the display of a power superior to its own, producing dread or the fear of punishment; and yet we have seen some parents, and among them those who from their position in society and the advantages of their education ought to have known better, relying upon this emotion as their source of authority, even in early infancy. Children thus treated soon become either timid, and, in the fear of doing wrong, do nothing at all, or else, careless of consequences, become callous and indifferent. The effect of fear, or rather fright, upon the young, is thus quaintly described by an old writer :—

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* Remarks on the Influence of Mental Cultivation and Excitement upon Health.—Amariah Brigham, M.D., Boston, U. S., 1833.

> " But above all take special care
> How children you affright and scare :
> By telling stories of things seen,
> Of sprite, demon, hobgoblin.
> Hence they'll contract such cowardice
> As ne'er will leave them all their lives.
> And then the ideas of their fears,
> Continued into riper years,
> Can by no reason be suppress'd ;
> But of them they'll be so possess'd,
> They'll sweat, and quake, and start, and stare,
> And meet the devil everywhere.
> Terrors have changed some men grey,
> Took limbs, and speech, and sense away ;
> Have topsy-turvied brains in skulls,
> Turn'd some men mad, and some men fools ;
> Have made a soul skip like a sprite,
> And leave the body bolt upright :
> Stark, staring, ghastly, dead, and stiff,
> Like Lot's sad monumental wife." *

We cannot expect a child to display those confiding and affectionate feelings which are natural to it, when by severity we make it fear us, convert every exercise of its feeble powers into a task, and express displeasure when anything we wish to be done is imperfectly accomplished. We should at first be content to see the will manifested, and the attempt made; and then, by encouragement properly given, the attempt will be repeated. These efforts, assisted by the principle of emulation implanted in the child, and encouraged by the feelings of pleasure arising from the consciousness and exercise of its own faculties, will soon lead to that proficiency which no coercion could have accomplished. The influence of fear, or the dread of punishment, defeats the object for which it is intended. Fear is a depressing agent: it weakens and sometimes paralyses the powers of the mind even in the adult. It cannot, then, be a proper agent in the cultivation of the feeble and imperfectly-formed mind of the child.

It is well known that many nurses are in the habit of using the influence of fear to assist them in governing the children under their care. Than this nothing can be more reprehensible; and from the moment a parent discovers that this is one of the influences at work in the nursery, she ought immediately, and at whatever inconvenience, at once to change the attendant.†

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* " Health, a Poem : showing how to procure, preserve, and restore it." To which is added, " The Doctor's Decade; by J. Bernard, M.D.: London, 1649." We have given the extract entire, because of its humour and rarity.

† We remember being called one evening, a short time ago, to visit a child said to be in a fit. On our arrival, we found the child (a fine intelligent little fellow about four years of age) sitting up in bed, ghastly pale, covered with a cold clammy perspiration, eyes wide open, and intently fixed on the door of a closet in the corner of the room, and breathing hurriedly. He appeared to be insensible to his mother's voice; and in whatever position he was placed he still endeavoured to turn his eyes towards the closet. We were puzzled how to act. However, remembering that he was a very timid and susceptible child, I opened the closet door to see if any one was concealed there. At once he gave utterance to a loud scream, fell backwards in bed, and for a few moments appeared as though he were dead. He then began to sob, and eventually burst into tears, threw his arms round his mother's neck, exclaiming—" Mary—bogey." The mystery was at once explained ; and after some prevarication the nurse confessed, that wishing to spend the evening with her fellow servants, she put the little fellow to bed before his usual hour; that he was restless and wakeful; and that to keep him quiet

Let us be assured, that if the inclinations or the moral and intellectual powers of a child cannot be developed and controlled in the manner in which we wish them to be, without the influence of threats, fear, and coercion, they never will be trained to any useful extent, or be made available for any pre-eminence in future education by such means. The time will come when the influence of fear will cease; and in its place there will be a dogged sullenness and brutal daring, which will manifest themselves by a contempt of all legitimate authority.

As the mind is developed, and attempts towards the enunciation of an articulate language are made, the child requires the society of other children about its own age. A child will not so heartily indulge in the healthful and (in moderation) invigorating romps of the nursery with those of more mature age. There is nothing in them to bring into play the feelings of emulation and self-confidence, or to sympathize in its imperfectly-formed ideas.

As all affections and moral ideas have a direct reference to human beings, so we ought, in endeavouring to follow the rule laid down—that the natural stimulant for any faculty is the display of the operation of the same faculty in another—to endeavour to let these manifestations in another be as similar as we can in their nature. The expressions and actions of a man may be, to a certain extent, imitated, but not understood by the child; whereas the same kinds of impressions manifested in a being of its own age, or a little more advanced, are displayed in a manner calculated to lead to a better appreciation of their intention and effect. It is unjust, and manifests but little acquaintance with human nature, for persons advancing in years to expect of the young that confidence should be all on one side. The human heart only opens to the heart that opens to it; and the susceptibilities of a child are just as tender as, and more easily wounded than, those of more mature age.

In infancy, as in more advanced age, we must feel attachment to some one, act kindly to some one, be angry with some one, fear some one, and seek the esteem of some one; for upon these innate inclinations depend the actions and many of the pursuits of our lives.

It is necessary, to the development of the powers given to us by the Almighty, and to enable us to direct them to ends calculated to insure our own happiness, that we associate with our fellow-creatures. Without doing this we cannot exercise the sentiments of justice, kindness, forbearance, and mutual regard; nor can we become acquainted with the differences which birth, education, and peculiar circumstances exercise in the formation of character. In the same manner the young require the kind of society fitted for their tender years; for companionship is quite as pleasing and useful to them as association with our fellow men is to ourselves.

How often do we find men, who have confined themselves to one class of society, and one peculiar mode of life, dogmatic in their opinions, overbearing in their conduct, and maintaining that all who do not feel as they feel, think as they think, and act as they act, are wrong. They have studied the world in books, not as it really is; and have so long lived in the belief that their opinions are right, and been so long treated as "the authority"

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she had gone into the closet, wrapped herself in a dark shawl, placed a fur travelling cap on her head, and as she issued from the closet made a hideous noise. Such an impression was made on the child by this cruel and unpardonable trick, that his bed had to be removed into another room; and for some months he dared not close his eyes unless some one was near him.

of their own secluded circle, that they become bigoted, and cannot bear to be contradicted. Surely if it is dangerous to be early initiated into the ways of the world, it is equally so to live too long secluded from it. We have known fathers insist that their children (even when they have attained the age of fifteen or sixteen) shall read the books they read in their youth, adopt the same ideas, express the same opinions, and not gratify a single inclination of their own without first asking permission—and what has been the consequence? In a short time they have been sent into the busy world, away from their parents' roof, to acquire some profession or calling, upon which to depend for a future livelihood. They now see the world as it is, not as it has been described to them. All its amusements and enjoyments are new, and consequently attractive. The change bewilders them—all is real. They are thrown into the society of other youths of their own age. The same imitative feeling and sympathy of mind which they possessed as children are called into exercise, and, whether for good or evil, they do "as others do." Never having been taught the necessity of self-reliance, and knowing only the theory of good principles without ever having been placed in circumstances calculated to elicit their practice, they follow those examples which appear to afford the greatest amount of enjoyment or minister most easily to the pleasures of the moment. The natural evil propensities of their minds have been hidden and kept down, not eradicated; and they throw off the restraint which has been too strictly placed upon them as easily as they doff their boyish garments. Had they, however, in childhood associated with children, been boys among boys, and had useful authority and proper correction not been carried to excess, then the change from all restraint to comparative liberty would not have exposed them to so many temptations, or have rendered them so easily the victims of bad example.

It is important, then, for the proper development of the moral and social affections and general character, that at an early age a child should enjoy the society of other children. Such association not only conduces to the happiness and enjoyment of the child, but from the various manifestations it elicits we can more readily detect the peculiarities of its own mental formation, and direct its early training according to the good or bad principles exhibited. A grown person cannot display that youthfulness of spirit, and readiness to be amused by trifling occurrences, required to qualify him to become the sole companion of childhood; and we may be assured that anything which is a task to ourselves is not likely to be very amusing or acceptable in its display to others. There have been and are men, and many of them distinguished for intellectual superiority and highly cultivated minds, who really enjoy the society and amusements of children; to them the ringing laugh of the child is pleasing music, his romps and playfulness a source of pleasure and relaxation, his display of rivalry and attempt to outvie others a pleasing study; and children soon discover their friends, and repay them for the manifestation of these kind feelings by a rich return of respect and affection. We often think that a man who cannot associate with the young, or join in and direct their innocent sports and pastimes, who calls their amusements frivolous, and esteems their time misspent, is like a man insensible to the charms of music: "there is something wanting somewhere," and we hope the deficiency is not in his heart.

Many parents entertain the mistaken notion that the passions and moral feelings manifested in the minds of children are entirely the result of mental cultivation, and that intellectual discipline will be sufficient to regulate them; and acting on this belief they threaten, lecture, and punish a child without endeavouring to explain the impropriety of the passion or feeling manifested. Fortunately, however, morality and religion have a much more solid basis than the mere theoretical deductions of an erring intellect. They are based on feelings implanted in the very nature of man, which neither cultivation can generate nor neglect destroy. It is true they may for a time be prevented from exercising that salutary influence which is necessary to the proper regulation of human conduct, but still they will eventually exert their authority and be admitted as true. These feelings should be acted upon from the first dawn of reason, and it should be the paramount duty of all having the charge of the young to secure to them at all times the society of those who are influenced by strict morality, and whose conduct shows the effect of religious principles.

We will now suppose that the child has arrived at such an age that memory is to a certain extent developed, and thought,* judgment,† and reason‡ are beginning to display themselves. We shall now be able to perceive how far our previous endeavours have succeeded, what the peculiar mental formation and bias of mind in the child under our care really is, and what kind of preliminary education is best fitted for him. We must bear in mind that there are the same differences in mental as in bodily development, and almost as many different turns of mind and peculiarities of disposition as there are different expressions of countenance, and that the grand principle in all preliminary education is not so much to burden the memory as to interest the attention. Those children who are slow of apprehension may have their intellectual powers gently stimulated and assisted by the repeated exhibition of the same object or idea, or may have it represented under circumstances and conditions better suited to their powers of perception and peculiarities of disposition. The manifestations of the moral faculties must be encouraged by presenting proper examples for imitation, and adapting these examples so that the practice of them shall result in pleasure and self-satisfaction. The development of any morbid feeling may be checked by withholding everything calculated to bring it into exercise, and by the exhibition of instances in which it has ended in pain or suffering, always taking care to present objects and examples fitted for the faculty to be exercised upon them. Then, again, children who show a premature development of the intellectual powers must be induced to join more in amusements with other children, and all available means must be adopted to prevent the over exertion of the mind. It is much more difficult to restrain the efforts of a premature intellect than to encourage the development of a dull one, but still it must be perseveringly attempted. The evils of the latter are much more easily remedied (in fact they often remedy themselves) than the mischiefs of the former are undone. Precocity of intellect is often a positive sign of disease, and children of this stamp should be carefully watched by their parents and medical attendant. Their pleasing acquirements should not be constantly displayed to please the pardonable vanity of the mother, or to gratify the curiosity of friends and acquaintances; by doing these things we only stimulate to exertion and add fuel to a fire perhaps already feeding on the sources of life. At an early period we often observe the manifestations of those impulses and tastes which determine the pursuits of after life, and if those tastes are in accordance with the circumstances and future intentions of the parents, there is no harm in letting the objects or ideas presented to the notice, and the toys and amusements, be of a nature calculated to encourage these tastes; but it is wrong to direct the attention to one object, or from an early age to make the preparations for and mode of education conduce only to the attainment of the knowledge necessary for one calling or pursuit. All knowledge, and all kinds of knowledge, so long as their use is governed by morality and prudence, are useful; for if any portion of information gained is not of much value in the abstract, or as a matter of personal advantage, still the very exercise of mind and thinking power necessary for the perception, remembrance, arrangement, and application of knowledge is a beneficial mental occupation, and the habits thus once originated are of value in whatever more special or distinctive channel they are directed. Some parents at an early age endeavour to imbue their children with one certain class of ideas, or teach them a certain number of things irrespective either of their mental development or intellectual peculiarities. Children soon acquire this kind of education; but, *cui bono?* they do not understand the nature or meaning of what they are taught, and the acquisition of knowledge of this kind is of no real utility either for their present or future; it is at best but "parrot education," amusing and useless. A child should first feel his own powers, and those in whose charge he is placed should ascertain that they exist in a state perfect, so far as their development has advanced, before any routine of education is commenced. From the neglect of this precaution we often find a child's head stuffed with a farago of imperfect acquirements, odds and ends of facts, and a heterogeneous jumble of ideas, which must all be eradicated before the mind is in a fit state to receive more useful and systematic education.

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* Thought is that faculty of the mind by which we attend to a series of ideas in the same succession as they occur.

† Judgment is that act of the mind by which we compare our ideas to determine how far similar or different.

‡ Reason is a series of judgments. "Natural Philosophy of the Human Body and Mind." By James M. Adair, M.D. 1788.

Thus, then, we have endeavoured to trace the first dawnings of intellect, and to show how preparation should be made for more mature mental culture. We have seen that the opportunity for education commences almost with life, and that, from the first smile that illumines the face, showing a sympathy of feeling with those about it, to the commencement of the innocent prattle which gives expression to the ideas and germs of thought rudely and imperfectly formed in the mind, the child requires and is fit for moral and intellectual training; and we have, so far as we could, tried to discover the principles upon which this preparatory tuition should be founded. The next question to be considered is, the age and mental condition at which that attention which is known as education or scholastic discipline should commence. This is a question which does not admit of one or a decided answer. So much depends upon natural peculiarities, different mental and physical development, previous training, condition of life, and many other circumstances, that no general rule can be laid down. Much depends upon the acuteness of those who have had the previous care of children, and the correctness of the opinion they have formed of the qualifications of those under their charge. Many children are imagined to be dull of comprehension, when in reality they are not so; they have been put to tasks, and to the acquisition of knowledge, for which there was no natural aptitude; or, perhaps, the objects presented to their notice have not been presented in a manner sufficiently attractive; whereas, had a little study been given to their natural characteristics, and the manner of teaching been adapted to the gradual development of their external senses and mental faculties, it would soon have been discovered that certain ideas would have been appropriated with avidity, and certain important facts indelibly impressed on the mind. Supposing a child to be born with only one hand, and that the left one, it would be the extreme of absurdity to insist that he should feed himself by the deficient member; and it is almost as absurd to expect a child to exercise a faculty which he does not possess. We may cultivate, but we cannot create. It does not follow that the most forward or interesting child shall be the most ready to receive the knowledge communicated to it, or retain it longest; or that the child esteemed dull or slow, who takes time to mature his perceptions and form his ideas, shall be the last in the race. We have known prodigies of three years dunces at twelve, and children who could scarcely be brought to understand the most simple mental process at six, clever at sixteen. One of the most distinguished authoresses of the present day could not read at seven years of age; her mother, however, lived in the hope that the maturity of mind and opportunity to acquire knowledge would eventually arrive—and so it did. At eighteen she published her first work, and, from the profits she realized, was enabled to pay her father's heavy but unavoidable debts, and before the age of thirty had published upwards of twenty volumes on various interesting subjects. Parents should never despair; the plodding industry of the dull child may in the end be of as much real utility as the quick perception and ready wit of the precocious and gifted. In the race mentioned by good old Æsop (we always speak of him with reverence, for we owe him much), the tortoise beat the hare; and the moral of the fable is daily realized in the world around us. We all love to see the manifestations of natural genius in our offspring; but if they are not thus gifted by nature, no exertion on our part, or willingness to receive instruction on theirs, can bring it into exercise, though much may be done to supply its place. It is, therefore, as idle to repine at the deficiencies of our own children as compared with others, as it would be to complain of the colour of their hair or the form of their features. We must take them as God gives them to us, and, instead of envying the natural endowments of other children, we must endeavour to form early habits of attention, industry, and correct perception in our own—qualities which will be of intrinsic value when the fitful exertions of mere genius, and the vivid but often incorrect perceptions of an exalted imagination, will be at fault. A man may be noted for integrity of purpose, perseverance, and high moral feeling, without being a profound classic or a skilful mathematician; and the moral nature of a man of distinguished intellect may be far from correct and perfect. Men of exalted genius are not always the most remarkable for sound judgment. The train of mental operations, and the previous education necessary for the formation of a sound judgment, are slow in their manifestations; but genius, influenced by an ardent imagination, arrives at rapid conclusions: and hence it is that ingenious men have often been very deficient in prudence and consideration for the feelings of others, and men of wit sadly wanting in wisdom and self-possession. A boy possessing natural genius often causes more trouble and anxiety to his parents, and requires to be more under control, than one not so gifted. His ingenuity may be exerted upon unworthy pursuits; he will be more prone to appreciate the ideal and imaginative than the real and useful; and if his soaring imagination be not checked, and means adopted to teach him correct taste and accuracy of perception, his future life will become a dreamy existence, of little value either to himself or to others.

But while it is impossible to form any general rule in reference to the proper period when scholastic discipline should be commenced, still there are a few considerations which may assist us in any individual case. It is not during the period a child is at home and under the care and influence of his natural guardians that all the faculties of his mind can be developed. When a boy is sent to a preparatory school he begins to discover that he must to a certain extent rely upon himself; and there cannot be a better instrument for the moral and physical development of the young than a school of this kind, conducted upon proper principles, and founded on a correct knowledge of the human constitution. In an institution of this kind the young are brought together, their affections and moral feelings are called into exercise, and in the manifestations of these feelings towards each other, in their cheerful and social enjoyments, they become more perfectly developed. It is true that these establishments, though good in themselves, have often been abused and misconducted. They have been made the means of close and debilitating confinement, and intellectual and theological cramming, without any attention being paid to the peculiar character of each child, or its capacity for the reception of knowledge. The evils attendant on the abuse of these institutions may be easily avoided, for no parent will send his child to a school without first ascertaining the principles upon which it is conducted, and the nature of the education given. If a child can read at six years of age, and from its reading gather some prominent idea and understand some simple fact described, we may be well satisfied, and deem him fitted for future education. If at this age the useful powers of the mind are not in some degree developed, we generally observe that the manifestations of the passions are so, and it is much more easy for a stranger to enforce moral restraint than for those with whom the child has constantly associated, and who perhaps have never attempted to maintain any authority over him. For this reason, therefore, it is necessary that for a time he should be under the sole control of one qualified for the task by firmness tempered with kindness and consideration. Due attention should likewise be paid to physical development: a child bodily weak and infirm will not derive as much benefit from association with other children as one of firm and robust health. He cannot join with them in their amusements; he is made to feel his weakness, and is often the sport of the evil-disposed and idle. It often happens that children of this kind are remarkable for quickness of perception and sensitiveness of feeling, and therefore, for reasons before stated, the period when they are sent to school should be delayed until their mental and physical strength are better proportioned to each other. Some children are sent to school at an early age from no other reason than to get them out of the way. To parents who act on this unnatural principle nothing can be said, for, from their own admission, it is a matter of little consequence whether their intellectual powers are developed or not, and the street would answer their purpose just as well as the schoolroom. Another point to be considered is the peculiar kind of education we wish to give our children. If, for instance, the acquisition of a foreign tongue, or the knowledge of various languages is our object, we may commence as soon as articulation and memory are sufficiently perfect to pronounce words or retain meanings, having first ascertained that a natural aptitude for these acquirements exists. Again, if a knowledge of mathematics, or the powers and properties of numbers, is our intention, we must wait until not only memory, but likewise the powers of comparison, association, and distinction of ideas have arrived at some degree of maturity. Not that this time must be wasted; much information may be conveyed by familiar and instructive conversation, and thus the mind may be stimulated to future exertion. Taking into consideration, then, the constitutional peculiarities, both mental and physical, the use that has been made of the period of infancy, the nature of the education required, and the principles upon which a scholastic establishment is conducted, a child may be sent to school from the ages of six to eight years.

If, after a time, there appears to be no aptitude for the acquisition of knowledge, we must wait with hope, give encouragement, endeavour to combine instruction with amusement, and awaken the spirit of emulation by showing the happiness arising from successful study in others. If, on the other hand, the child at once enters with pleasure on his studies, we must take care not to overtax or seek for a too rapid proficiency. Those educations are always the most sound and useful which have been acquired gradually and step by step, so that one part of a study has been thoroughly understood and appreciated before another has been commenced.

Many parents have been sadly disappointed in their choice of a tutor for their children, by cherishing the idea that a good scholar must necessarily be a good teacher. There is a wide and important difference between the possession and the communication of knowledge. A man of finished and extensive education has often been so long in its acquisition, that he forgets the slow and progressive manner in which he has attained it; and it becomes a task for him to descend to the first principles and minutiæ which he at one time thought of so much importance. There is such a qualification as "teaching power;" without it a teacher, however learned he may be, will be unsuccessful, and whatever pleasure or profit he may enjoy from the riches of his own understanding, he will never be able to implant a thirst for knowledge in the minds of others. Nay, the display of high intellectual pre-eminence, expressed in technicalities, and according to fixed rules, will often lead to despair, or perhaps disgust, in those whose minds are not sufficiently matured to understand their meaning. The summit of the mountain seems a long way off before we have commenced our ascent, but when we begin to feel that we rise higher with every step we take, hope becomes our attendant, and we are cheered on to persevere until our wishes are accomplished. The power to communicate knowledge is in many men a natural qualification, and to those who do not possess this natural gift, the normal schools, and the many opportunities of the present day, are of great advantage towards the development and cultivation of this valuable faculty. The way to the acquisition of any branch of knowledge may be the same for all, but it is possible for one acquainted with its asperities to direct us so as to avoid them, and to point out places where we may safely rest and recruit our strength. One accustomed to the path, and who has experienced its difficulties, knows what amount of progress to expect from the strong and robust, and how to apportion the journey of the day to the weak and feeble. Our guide in the ascent of Mount Blanc founded his claim to our notice upon the number of successful ascents he had made, and we trusted to the knowledge arising from his experience, and returned in safety.

The elements of success in all teaching are simplicity, a thorough knowledge of human nature, and an aptness to convey information in all its progressive forms. Teachers must not only look on their responsibilities as a duty, but must also make them a study, and bestow as much attention upon the manner best calculated to convey instruction, as they have done upon the acquisition of knowledge necessary for themselves. They must not only think but observe, not only possess but communicate; and their toil is not without its reward. A duty conscientiously performed is generally repaid by the pleasure of success; and even, if in spite of all exertions, we do not succeed so far as we anticipated, still it is a great consolation to know that we have left no effort unattempted, and no duty unperformed.

Thus, then, we have endeavoured (imperfectly it is true) to trace the mind, from its first feeble manifestations until the period when it becomes fitted for the reception of the education necessary for its future maturity and usefulness. We have endeavoured to point out some of the errors frequently committed in the moral and intellectual culture of children of tender age; lightly sketched an outline of the duties of those to whom the education of the young is committed; and, so far as our knowledge extends, have endeavoured to point out the principles upon which the formation of the mind should be attempted. The preparatory culture of the minds of the young, and the means to be employed for the attainment of future excellence, like everything else of real value, involves much labour, much time, and much anxiety. In whatever state or at whatever age sound moral and intellectual superiority is sought, there is no royal road to its possession; we may point out the track which appears the nearest approach to the end sought, warn you of the pitfalls which beset your path, tell you of the safest place where to ford the rivers on your way, and show you how to distinguish between the uncertain lights of error and the brilliant guiding-star of truth. The remainder of the task is your own, and success depends upon your industry and perseverance; you must make firm your own footing, and lead your tender charge by easy journeys and frequented ways; sometimes you may carry him in your arms; but however slow his progress, it must be made by his own tiny feet; you must not attempt any rapid stride or daring leap, but, adapting your robust manhood to his tender years, you must teach him to imitate you, not so much in the extent as in the direction of his steps. Perhaps it will sometimes be necessary to retrace your progress, and go over the same ground again and again; but this must be done without impatience or hurry. And thus, being companion, guide, and protector, you will lead him by the hand until his footing becomes more firm, his feet less tender, his vision more perfect, and he takes interest in and derives pleasure from his journey. By and by he will have to be committed to the charge of a guide whose duty it is to lead him to higher and more important discoveries, and will be called upon for the more active exercise of those energies which it has been your duty to develop and encourage. And you must have full confidence in the guide you choose, your paternal affection must not blind you to the weakness and deficiencies of your offspring; you must be content with the useful mediocrity attainable by the judicious direction and exercise of feeble powers, when you cannot enjoy the manifestation of that superior excellency only to be acquired by those of genius and natural gifts, remembering always, that "*Man is but the servant and interpreter of nature, and is limited in act and understanding by the extent to which he has observed the order of nature; beyond this neither his knowledge nor his power can extend.*"—*Bacon.*

W. P.

PAPERS ON PHYSICAL GEOGRAPHY. No. 4.

THE OCEAN.

The time is not distant when the phenomena which belong to the watery division of our planet's surface will be felt to possess an interest scarcely (if at all) inferior to that proper to its solid portions, and when it will be held essential that our school-books on geography should possess their chapters or sections devoted to the class of facts connected with the sea, as well as to those that relate to the land. Something of this sort is indeed already admitted, in the recognised study of physical geography, alike in relation to the three great divisions of the solid, the liquid, and the aerial worlds; and our books devoted to this subject trace the general course and properties of those marine currents and other movements which are amongst the distinguishing features of the ocean's realm, as they do of the analogous movements in the atmospheric kingdom. But this is not enough; each ocean, and each part of the ocean—each inland sea, or gulf, or channel—requires its own proper description; and not more for the sake of inquiries that may interest the naturalist, as they must awaken the attentive regards of every intelligent observer, than in virtue of the direct bearing of such subjects upon the interests, the welfare, and the every-day pursuits, of an industrious mercantile community.

If there be any people to whom such inquiries are matter of more than ordinary interest, it is assuredly the British—the inhabitants of a country in reference to which the saying that "her march is on the ocean-wave" possesses the most literal (as well as lyrical) truth. We are daily training up, in our popular schools, thousands whose future lives will be for the most part passed upon the waves, and with whom the wild music of the ocean's roar will hereafter come to be ranked among the most familiar of daily experiences, and tens of thousands, whose ordinary avocations are in immediate connection with the pursuits, dangers, and hardships, of a sea-faring community. Under such circumstances, who will not admit that a knowledge of the sea—of its divisions, its climates, its productions—is equally important with the knowledge of similar subjects connected with the land?

Among the empires of the older world, that of Rome alone supplies any parallel to the case of Britain, in regard to considerations of such a description. All her provinces lay ranged around the basin of the Mediterranean. That great inland sea was the natural highway of communication between the different parts of the empire—the medium of commercial intercourse—the means through which the east and the west exchanged their respective produce.

The Mediterranean and its coasts constituted the Roman world. All its portions were fraught with interest to the Roman people. Its lesser seas, gulfs, and channels—the Ægean, the Hellespont, the Indian and Sicilian seas, the Euripus, the greater and lesser Syrtes—required to be examined and *studied*, their prevailing winds and currents inquired into, their dangers made familiar to the mind. The empire of Britain reproduces similar social and intellectual wants upon a wider scale. The ocean at large is *our* Mediterranean, and the seas that our ships frequent possess an interest similar to that which belongs to the mountain-chains, deserts, valleys, or table-lands, which diversify either continent.

Take the case of any one of the lesser divisions of the ocean; for example, say, of the Gulf of St. Lawrence. Is it sufficient for our Geographies to tell us (which is all that the most extensively used among them *do* tell) that it is one among a numerous list of "seas, gulfs, &c." that belong to the American division of the globe? What account of the British possessions in North America can be regarded as complete (or even possessing tolerable claims to completeness) without some notice of the peculiar character of this nearly land-inclosed basin, of its fogs, its snow-storms, its masses of floating ice and analogous phenomena, which render its navigation a task that demands at all times more than ordinary caution, and at particular seasons of the year make it in the highest degree perilous? Yet the Gulf of St. Lawrence is *necessarily* one of the most frequented of seas, since around it lie the shores of Canada, New Brunswick, Newfoundland, and others of our colonial possessions, while the great estuary of the river whose name it bears is reached by the navigator through the medium of its waters.

Or take, in another part of the world, the sea that again forms in modern, as it did in ancient times, a channel of communication between the opposite shores of the Old World, and that is especially interesting to us as being an important link in the chain of communication between Britain and her Indian possessions. Turn to even a "revised and greatly enlarged" edition of one of our popular school-books, and what do we find concerning the Red Sea, beyond the occurrence of the name, in the usual dry and unattractive list of such oceanic divisions—excepting the remark incidentally added (with amazing profundity) elsewhere, that the colour of its waters has originated their common appellation—not a word being said about the circumstances to which this aspect is itself due! Not a particle of information respecting the peculiar shape, the bordering mountain chains, the coral reefs (with their curious and varied forms of animal life), the prevailing winds and currents, of this remarkable ocean-valley. The *name*, and the name only, is all that is told regarding it, and that in a volume of between three and four hundred pages!

It is thus with other things in geographical tuition. We teach *names*, and names only, neglecting the facts, the attendant circumstances, and the associations, which alone impart vitality to them, and give them positive and tangible value. It may be attempted to draw a distinction between the information that belongs to physical geography and that proper to commercial or political geography, as it is commonly termed, as though what belonged to the former belonged to *it* only. But it is not really so. They *cannot* be separated, and it is absurd to attempt it. The geography of the natural world enters into, and forms a living part of, the geography of commerce, the industry of nations, and the political arrangements of races of men. The facts of the one class bear directly upon those of the other, and they must be taught *together* if their mutual relationship is to be rightly understood. It is as interesting, and as important, to know that Vesuvius is an active volcano (though its internal fires may for a time lie dormant) as to know the statistical fact, that a population of eighty thousand souls are gathered around the sloping sides of the mountain, or to be able to repeat (with parrot-like volubility) the names of the villages in which they dwell, or those of the towns that lie spread along the slumbering shores of the neighbouring sea. And the one fact connects itself with the others, for the hidden fires of the mountain may again bury these towns beneath their ejected ashes, as they did the cities of an older date, or as volcanic phenomena in another form have repeatedly laid in ruins the towns and villages of the adjacent regions of southern Europe.

Either physical geography is a part and parcel of *all* geography, or it is almost nothing—a theory, and a speculative exercise of the mind. It will not do to treat it as a separate thesis: it must be taught *with* other geography, as a part (and that the fundamental part) of it. And this may be just as well done (within the limits marked out by the requirements and opportunities of each particular case) in an elementary lesson as in the profoundest disquisition—in the school-room as in the lecture-room—in the class-book as in the volume of larger bulk and higher claims. Even to learn the principles of geography as a science is, *per se*, not enough: *these principles must be applied to the inquiries respecting each particular country*, or each particular tract of the ocean, if the facts which they embrace are to have purpose and vitality imparted to them. The *whole* subject of geography, thus treated, becomes a science, and all the facts which it collects and classifies are seen in their mutual dependence on one another.

We have been incidentally led to these remarks in connection with our present subject, which relates to some of the observations that have been made within the last few years upon the various phenomena of the ocean, more particularly with reference to the depth of the sea, and to the movements that agitate its waters. For many of these observations we are indebted to the intelligent labours of an officer of the United States navy, Lieutenant Maury, whose name has become extensively known in our own country, and indeed among maritime nations in all parts of the globe, in connection with the improvement of the practice of navigation.

To ascertain the depth of the sea in the immediate neighbourhood of the land, or in the narrow seas that intervene between adjacent coasts, is a matter of direct and obvious necessity. The mariner requires the frequent (and in some cases almost constant) aid of the sounding-line to warn him against the hidden dangers that beset his path. This is especially the case in those seas where fogs frequently prevail—as in the case of the North Sea, or in the Gulf of St. Lawrence—and where the dense condition of the atmosphere, for days and weeks in succession, alike prevents surrounding objects from being seen, and precludes the possibility of taking celestial observations. In these cases the navigator literally *feels* his way along the bottom of the sea, and the comparison of the depths indicated by the lead, with a carefully prepared chart, enables him to pursue his course in comparative security. In the Gulf of St. Lawrence, the fogs are frequently so dense as totally to conceal from sight a vessel sufficiently near to be within hail, and the heavy snow-storms which occur during a particular season of the year occasion equal embarrassment to the mariner, completely obscuring everything from sight.

In the North Sea, similar moist and obscuring vapours are of continual occurrence. Hence the necessity for the most elaborate charts, such as those which the labours of the British Admiralty have caused to be issued of late years, and which show, by the multiplicity of the soundings that are marked, every variation in the level of its bed. To accumulate the observations required for such a purpose requires the careful labours of many successive years, and the patient endurance of hardships and privations that it is difficult to appreciate duly. But a careful inspection of the charts which embody these results, and thus render them available to the ships of all nations, is a task at once interesting and instructive.

Similarly, every harbour that shipping frequent, every river that possesses a navigable entrance, requires an elaborate and careful survey of its depths, and an investigation of the changes to which they may be at times liable, from the influence of winds or currents, or tidal phenomena. Surveys of such a description are constantly exercising the labours of our naval officers in distant parts of the globe, as well as immediately around our own coasts. In the course of these and similar labours, attempts had frequently been made to ascertain the depths of more open parts of the sea, at greater distances from land; but it has only been within a recent period that the obtaining of deep-sea soundings, in the wide and seemingly fathomless ocean, has been successfully accomplished.

Many years since, soundings were made in the Caribbean sea, to a depth of 1000 fathoms (or 6000 feet), without finding any bottom, and in the sea to the east of Greenland, to the depth of 7200 feet. Depths of more than 6000 feet have also been ascertained in several parts of the Mediterranean. Vastly greater depths than these have, however, since been found to belong to the Atlantic basin, both to the northward and southward of the equator. Our countryman, Sir James Ross, in 1843 ascertained a depth of 16,000 feet in the Southern Atlantic, to the westward of the Cape of Good Hope, and let down a sounding-line of 27,000 feet (or a little more than five miles), without finding bottom, west of St. Helena. At a subsequent date, in lat. 28° 21′ S., long. 29° 17′ W., an officer of the U. S. navy (Lieut. Goldsborough) obtained bottom, in another part of the same ocean, at a depth of 3100 fathoms, or 18,600 feet (about 3½ miles).

The soundings of Sir James Ross (at that time the deepest upon record) have been since exceeded by others made by the officers of the U. S. navy, in the northern half of the Atlantic basin, as well as one of later date, due to a British officer (Captain Denham, R. N.), in the southern half of the same ocean. In 1849, at a point three hundred miles to the eastward of the Bermudas, no bottom was found with a line of 5700 fathoms (or very nearly six and a half miles) in length. In 1851, nearly under the forty-fifth meridian, and about the latitude of 39° N., bottom was found with a line of 5500 fathoms long, or, allowing for drift (that is, for the deviation of the line from a perpendicular direction, owing to the influence of currents), at a direct depth of 28,950 feet—about five and a half miles. One degree further eastward, and nearly under the same parallel, the sounding-line indicated bottom at 13,800 feet, or less than half the previously ascertained depth.*

All these depths are, however, exceeded by the observations of Captain Denham, who in the course of last year, during a passage from Rio Janeiro to the Cape of Good Hope, found in lat. 36° 49′ S., long. 36° 9′ W. (a spot situated about midway between the islands of Tristan d'Acunha and the mouth of the Rio de la Plata), the extraordinary depth of 7706 fathoms, equal to 46,236 feet, or eight miles and three quarters! In this case, also, the bottom was undoubtedly reached, but unfortunately the sounding-line broke, in the process of drawing it up, when near the surface, so that no visible indication of the precise character of the ocean's bed at this immense depth was obtained. The time occupied by the line in running out was nearly nine hours and a half, its rate of speed progressively decreasing as it reached greater depths. Thus, while the first thousand fathoms of line ran off the reel in twenty-seven minutes, the last 706 fathoms occupied an hour and fourteen minutes in doing so.

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* A highly interesting account of these observations by the U. S. navy was given to the public in the pages of a popular periodical, the "Household Words," for May 29, 1852.

After all, neither these considerable depths, nor the numerous inequalities in the level of the ocean's bed which they (as well as similar observations) indicate, are greater than might be inferred from our knowledge of the inequalities which diversify the visible surface of the land. The aqueous portion of our globe's covering, vast as is its extent, constitutes but a superficial interruption to the uniform continuity of the solid portions of the earth's structure. The planes of the land are everywhere continued beneath the surface of the water, and their inequalities are repeated beneath the waves. The islands that rise at intervals above the depths of the ocean are the summits of sub-marine mountain chains. A trifling alteration in the relative levels of land and sea would in many cases alter the external contour of whole tracts of country, would convert steppes and prairies into vast inland seas, and destroy the continuity of adjacent high lands. Hence the fallacy of the idea once entertained by geographers, that an extensive continent must exist in high latitudes around the antarctic pole, as a necessary balance to the small proportion of known land within the southern hemisphere.

It might naturally have been inferred (and, at a later period, *was* so inferred) that the greatest depths of the solid matter of the globe would be found at least as far *below* the level of the waters as the known heights of the land were raised *above* the same level. On the supposition that these measures would bear a direct proportion to the respective areas of land and ocean, it would follow that the deepest portion of the water's bed might be supposed to exceed, in a ratio of nearly three to one, the altitudes of the loftiest mountain summits. The deepest sounding of Sir James Ross (27,600 feet) nearly coincides with the heights of the culminating peaks of the Himalaya, while the observation of Captain Denham shows a depth which exceeds their altitude by nearly three-fourths.

The bed of the ocean, then, has its mountains and valleys, its table-lands and plains, its steep descents and narrow ridges, its inclosed basins, gorges, and ravines, like the similar features on the face of our continents. The equalizing influence of watery action no doubt tends to fill up the lesser inequalities of level, and to remove the outward prominences of the rocky material; but even this operation does not exceed the similar changes which are due to atmospheric influences continually acting upon the surface of the land. The added height of the Himalaya peaks and of the greatest ascertained depths of the sea, though it amounts to little less than fourteen miles, forms but an exceedingly trifling fraction of the earth's radius. Yet, considered in relation to man, and to man's works, it becomes surpassingly great!

Another interesting subject of recent inquiry relates to the height to which waves are raised above the ordinary level of the water's surface during a long-continued gale of wind, and to the rate of speed at which they travel forward. The actual height of the wave is found to be less than mere visual impressions lead the observer to suppose; but it is, of course, the *slant* height of the moving mass of water that is seen by the spectator; added to which, is the consideration that the apparent height, from bottom to crest of the wave, is really double the actual height which the summit reaches above the *mean* level of the water's surface. A ship alternately occupies the hollow, or trough of the sea, between two adjacent waves, or rides high upon the crest of the waters. The mean between these two positions coincides with the level of the ocean's surface when in a state of repose.

Colonel Reid measured the height of the waves in ordinary gales of wind, upon the south coast of England, by means of a graduated pile fixed on the outer end of the chain-pier at Brighton, and found that their height was twelve feet, while they travelled forward at the rate of twelve miles an hour. Afterwards, another observer at the same place ascertained a height of thirteen and a half feet, with a velocity of nineteen miles per hour. But this is below the height which the waters reach in the deep basin of the open ocean, where wind and water alike exercise their unimpeded strength. In the deep sea of the Atlantic, Captain Fitz Roy measured the height of the waves, by ascending the rigging of a frigate to an elevation such as enabled him to look *over* their highest crest, so as to gain an uninterrupted view of the horizon, and found them to be sixty feet high, computed from the trough (or half that height above the mean level of the water's surface).*

But the most complete series of observations on this subject was made by Dr. Scoresby, in the course of two voyages across the Atlantic, in 1847-8.† In this case also, the observer continued to ascend to successive heights above the vessel's deck until he obtained a clear and uninterrupted horizon. Some of these observations were made during the continuance of a violent storm, of thirty-six hours' duration. The result showed that the average height of the Atlantic waves, under such circumstances, was fully thirty feet above the trough, or half that height (fifteen feet) above the mean sea-level: while the mean of the highest waves was about forty-three feet above the hollow occupied by the ship.

The height of waves thus generated in the open sea must, however, be distinguished from that caused by the resistance of any solid obstacle, as when they meet an iron-bound coast, or when their advance is checked by any medium, natural or artificial. In this case the mass of water rises to vastly greater heights, breaking over the tops of the highest lighthouses, or rolling high up the face of a vertical cliff.

Dr. Scoresby's observations related also to the velocity of the waves, and to the proportion which this bore to their breadth—or to the direct distance from crest to crest of two adjoining waves. The latter measure was assumed (from a variety of considerations) to be about 600 feet, and the observed rate of motion at which they advanced was about thirty-two miles an hour.

The force of pressure exerted by waves during a storm is enormously great, and becomes immensely increased in proportion as their velocity is greater. According to the experiments of Mr. Stevenson (during the erection of the Skerryvore lighthouse, off the west coast of Scotland) it appeared that while the average pressure of the waves during the summer months was equal to 611lbs. weight on a square foot of surface, in winter it became 2086 lbs., or more than three times as much. Hence the displacement of enormous masses of rock during the winter gales that so often spread ruin along our coasts, and the injury caused to our piers and similar works, even when composed of the most solid masonry. The largest blocks of stone are at the mercy of wind and water. The natural forces exerted by the aqueous and the aerial elements are not less important than those that belong to the agency of subterraneous fire.

W. H.

(*To be continued.*)

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* See Reid "On the Law of Storms." Second edit. London: 1846.

† A detailed account of these observations was communicated to the British Association for the Advancement of Science, at the Edinburgh meeting, in 1850.

CAMBRIDGE INDUSTRIAL SCHOOL.

THIRD ANNUAL REPORT.

The receipt of the Third Annual Report of this institution enables us to continue our record of its progress during another year. In the September Number of last year we gathered, from the Second Annual Report, some account of it in its more settled condition, having in previous Numbers given a general sketch of its design and origin, and of its working to that time. The present Report is drawn up with a view to a comparison between the past year and that which preceded it, and begins by stating that, when the last Report was presented, the school had just reached its full extent in point of numbers. The rate of attendance had increased from small beginnings, until the average had amounted to very nearly fifty, the maximum number contemplated by the Committee, and the attendance on particular days had exceeded that number. During the past twelve months the attendance has been considerably less; and as it is important to assign the true reason of this decrease, it is distinctly shown in the Report, in the following comparative table:—

	1851.	1852.
April	30	40
May	32	35
June	32	34
July	32	28
*August	18	—
September	30	28
October	30	28
November	36	30
December	45	32
	1852.	1853.
January	46	33
†February	45	25
March	40	25

"This diminution in numbers was not altogether unexpected by the Committee, who stated, in the last Report, that on April 5 they made an order that no more boys be admitted until further notice. From this it will be seen that the diminution of the numbers was in the first instance the act and deed of the Committee themselves, rendered necessary by the state of their finances; the order limiting the number was continued in force until the harvest was past and the winter drawing on, and the Committee then determined to admit a larger number of boys. It was anticipated that the number would at once rise to its full extent as before; such, however, was not the case, and it is important to discover the reasons. One reason has probably consisted in the difficulty of making it known that boys might be admitted upon application; this difficulty was found to be greater than might at first sight appear, and the Committee feel disposed to concur in the opinion of the Master in attributing to it considerable force. It is possible, also, that the regulations and discipline of the School may have proved distasteful, and that more unwillingness to submit to these may exist at present than when the School had more of the character of novelty. This is certain, that in some cases parents to whom application has been made have shown culpable neglect of duty in not insisting upon their children's attendance, and in some cases parents have preferred that their children should remain in idleness, thinking that they were more likely in that condition to find employment than if engaged at the School—a conclusion which the Committee are happy in believing to be contradicted by experience. But, in addition to reasons such as these, the Committee are inclined to believe that the class of boys for whom the Industrial School was intended has actually diminished. It is hardly possible that emigration should have taken place to so enormous an extent as has been the case within the last few years without absorbing a good deal of the idleness which it was

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* Harvest—a month's holiday.

† 52, some days during this month.

the design of this School to correct. So far as this cause produces a permanent diminution of numbers, it is clear that the Committee can find no matter for regret. Lastly, it may be remarked, that, unlike other schools, the successful operation of this Institution implies and produces a rapid loss of boys, the very design of the School being to assist them in obtaining occupation.

"The number of names on the books at present is thirty-one, and the ages are as follows. The corresponding table for last year is also given.

1852.	1853.
1 over 19 years.	3 over 19 years.
1 ,, 18 ,,	1 ,, 18 ,,
6 ,, 17 ,,	2 ,, 17 ,,
3 ,, 16 ,,	5 ,, 16 ,,
12 ,, 15 ,,	11 ,, 15 ,,
10 ,, 14 ,,	5 ,, 14 ,,
9 ,, 13 ,,	4 ,, 13 ,,

"No alteration has been made either in the time table or in the dietary since the last Report was presented.

"The industrial occupations have been nearly the same as for the previous year. Instruction was given in basket-making for several weeks during the winter by a basket-maker, who attended at the expense of the Rev. W. F. Witts. It was found, however, that very little useful knowledge of this trade could be imparted to the boys without a greater amount of teaching and practice than it was found possible to give. Owing to the unusually rainy character of the season, the greater part of the past year has been very unfavourable for field operations, and it has been found necessary to devise employment for the boys within doors. This has sometimes proved a difficult task, and if the number in attendance had been equal to that for last year, would occasionally have been hopeless. Basket-making was, in this respect, exceedingly serviceable; knitting and netting have also been resorted to, and the trellis-work which now surrounds the school-house is the result of the occupation of the boys on rainy days.

"The Rules laid down by the Committee, and which were given in the Report of last year, have been found upon the whole to work well. An attempt was made to render the regulations in some respects more stringent, but it was not found possible to enforce them.

"The Committee have to acknowledge the kindness of those gentlemen who have acted upon the Assistant Committee, some of whom have visited the School with great zeal and attention. In order to insure the attendance of some members of the Assistant Committee in each week, the Master has been directed to send a boy at the commencement of the week to two of the number, with a notice requesting their attendance; in case of either of these expressing his inability to comply with the request, the boy is directed to carry the notice to another member, and so on until the promise of attendance from two at least has been secured.

"No new expense has been incurred for buildings or other improvements during the past year. The Committee have nevertheless to announce the enlargement and very great improvement of the school-room: for this the friends of the Industrial School are indebted to a member of the Committee, the Rev. W. F. Witts.

"The actual results of the School are not properly to be estimated either by the number of names upon the books at present, or by the average weekly attendance throughout the year. A more just view will be arrived at by considering the whole number of boys who have passed through the School in the course of the year, and the number of those who have obtained situations or work more or less permanent.

"The whole number of boys who have been in the School from March 1852 to March 1853 appears to have been sixty-two. Of these, twenty-three have obtained permanent employment; two have enlisted in the militia, and continue to attend the School when not on service or unable to obtain work; and fourteen have left the School for temporary employment. From this statement it will appear that the succession of boys in the School is rapid, and that, whether the plan of the Institution be altogether successful or no, it is certainly not liable to the complaint that it tends to keep the boys from finding occupation.

"Of the twenty-three boys above mentioned, one has enlisted into the army; another has been taken to London by a relation, who has expressed his gratitude in the warmest manner for the benefits received by the boy in the School. It may be mentioned of another, that when he first entered the School he exhibited an extreme repugnance to regular work, but, after having been under the influence of the Master for some time, he was persuaded to seek employment, and has now for nearly twelve months been engaged in daily labour of a rather severe kind. This boy, during some weeks of the winter, being unemployed, came to find occupation in the School, from which he returned to his master as soon as work was again to be had. In some other cases boys who have had regular employment, but have been casually for a short time without work, have made a similar use of the School, and have so been saved from the temptations and dangers of idleness. One more instance of the beneficial action of the School may be introduced: it is that of a boy, who, having obtained occupation during a portion of each day, and attended the School during the remainder, has been able to deposit a considerable sum in the savings' bank, and will in all probability be shortly apprenticed by means of his own earnings. On the whole, the Committee have reason to believe that those boys who have left the School for employment have given satisfaction. In some instances the highest praise has been awarded to them; in others, hopes which had been formed have been more or less disappointed. This must always be the case; and as the Committee are not desirous, on the one hand, of over-estimating the success of their endeavours, so, on the other, they are determined not to be discouraged by the failures with which they are sure to meet.

" In their last Report, the Committee stated their belief that the greater number of faults committed by boys of the Industrial School have been committed upon the Lord's-day. The boy whose offence and punishment gave rise to the remark having petitioned for re-admission into the School, was admitted on the condition of regular attendance at church, to be certified to the Master of the School; and he is at present in the School upon this condition. The Committee have had under their consideration, from time to time, the question of the possibility of obtaining some direct influence upon the boys during the Sunday, but have not arrived at any satisfactory conclusion. The Master endeavours as much as possible to influence them, during the six days of the week, as to the proper manner of employing the seventh, and the Committee have ascertained that a considerable proportion of the boys are in attendance at Sunday-schools.

" The Committee have cause to rejoice that the Industrial School has continued during the past year to excite attention, and call forth imitation in various parts. In illustration of this it may be remarked, that the Committee understand that the introduction of the Industrial principle has lately been determined upon at the Cambridge Union, and that the necessary arrangements are now in progress for carrying out the plan: and the Committee cannot refrain from expressing the satisfaction which they felt in observing that in the last Charge delivered by the late Bishop of Lincoln, the Cambridge Industrial School was referred to by that much lamented prelate as a hint worthy of being followed in parts of his own diocese.

" Every year, it is hoped, the profits of the land under cultivation will increase. During the past year the income from this source has been considerable, and there appears to be every reason to believe that the next year will witness a further increase; still it can scarcely be expected that the School should be anything like self-supporting, and the income from annual subscriptions is considerably less than the wants of the School demand. During the past year not only annual subscriptions but donations to a considerable amount have been absorbed in the current expenses, a course of proceeding from which the Committee are extremely averse, and to which they would not have consented unless compelled.

" The Committee would again press a point upon which they have remarked on former occasions, namely, that presents of cast-off wearing apparel of all descriptions are extremely acceptable and useful. Many such gifts have been received, and acknowledged in the list appended to this Report. The Committee have also gratefully to acknowledge various other gifts in kind, which have proved a great saving to the funds of the School; such as leather, cloth, books, maps, tiles for draining, and manure for the land. It is believed that by means of gifts of this description much might frequently be done for the School, without any great expense to the donor, sometimes without any expense at all.

" This is perhaps the proper place to mention that the Committee are anxious to obtain the means of apprenticing a boy at present in the School; the circumstances are these: the boy was admitted about two years ago, after some discussion on the part of the Committee, in consequence of his being a cripple unable to walk without crutches, and therefore apparently unfit for field labour. He was however admitted, and under the kind direction of Mr. Ficklin, and probably from the effects of regular habits, has improved exceedingly in health, and not only so, but has succeeded in earning a good character from the Master and the Committee. The boy being, on account of his lame-ness, unable to obtain his livelihood except by a sedentary trade, and having made some progress in shoe-making in the school workshop, the mother also being a widow, the Committee are desirous of apprenticing him to a shoemaker. Any contributions towards this purpose will be thankfully accepted either by the Secretary or by the Master of the School.

"The decrease in the attendance during the past year has already been alluded to. It remains to be seen whether, supposing the funds forthcoming, the number originally proposed as the complement of the School can be generally kept up; should this not be the case, it has occurred to the Committee that they might, without departing from the proper ends of the Institution, propose to the Governors of the neighbouring National Schools to permit a class of the elder boys to attend during certain hours for the purpose of industrial employment. No scheme has been matured regarding this subject, and the matter is only alluded to in this place in order to point out to the Subscribers that in the event of the operations of the School upon the original plan being rendered unnecessary by the great demand for labour, there is still an abundant field of usefulness open.

"The Committee cannot conclude their Report without expressing their continued satisfaction with the efforts made by the Master for the good of the School; much must always depend, in Institutions such as this, upon the zeal, willingness, and integrity of the Master; and the Committee are convinced that the success of the School has been in a great measure due to the discretion and ability with which the Master has presided over it, and which they are glad to acknowledge.

"The future course of the School must be decided by circumstances; if the numbers appear to be permanently diminished, it will be for the Committee to consider whether (as above suggested) any additional means of usefulness can be found; if, on the other hand, it should prove that the decrease of numbers has been only temporary, an effort must be made to support the School with its full complement of boys: in either case the Committee will use their best endeavours to turn to good account any funds which may be placed at their disposal; and they entreat the Subscribers not to allow an Institution, which has already produced most beneficial results, both directly and indirectly, to be crippled in its powers of usefulness for lack of pecuniary means."

THE BENEFITS OF EDUCATION DEPENDENT UPON GOOD CONDUCT.

The grand object of the mental improvement of the industrious classes is, as we observed in a recent Number, to unfold the higher faculties of reason and imagination which those classes possess in common with the best born and the best educated, in order to raise them above low tastes and mere animal indulgences, and thereby to elevate their character rather than their station. But it may be added, that in pointing out elevation of character rather than of station as that which should be the main object of mental improvement, we are also pointing out the only sure mode of attaining to such elevation in station as will prove at once creditable and lasting. For there can be little credit or security, and still less happiness, in any change of station, when the person raised does not possess proper self-control, or when his tastes and habits are unsuited to the change. And such will, for the most part, be the case of those, if successful, who aim only at elevation of station instead of the proper qualifications for it. Whereas, if elevation of character be sought by cultivation of the higher faculties, and by the acquisition of self-control, a person will thereby become not only fitted for a higher station, but also furnished with the best means of attaining it. In a country like our own, where examples of men in the humblest station raising themselves to affluence and distinction are so common, instances of the truth of the above observations need hardly be adduced. There are, however, not unfrequently so many apparently accidental circumstances connected with success, that it is often difficult to decide in any particular case whether success is mainly to be attributed to good fortune, or to education and good conduct. Of itself, indeed, mere good fortune can do but little, as has been so well expressed in the following lines, which form the motto of a chapter in the "Fortunes of Nigel:"

> "Chance will not do the work—Chance sends the breeze;
> But if the pilot slumber at the helm,
> The very wind that wafts us toward the port
> May dash us on the shelves.—The steersman's part is vigilance,
> Blow it or rough or smooth."

But still the question arises, whether the chance, or, in other words, the favourable opportunity, be for the most part indispensable, or whether education and good conduct can ever be regarded as the main causes of success.

In perusing a recent publication by the Rev. Erskine Neale,* it has occurred to us that perhaps no course of life affords a better opportunity of tracing the benefits of education, joined with good conduct, in causing elevation of station, than the military profession, as illustrated in the case of those who have risen from the ranks to offices of trust and posts of honour. Of those who enter the army as privates, all start upon the same footing, and, as far as entering the profession is concerned, are under similar circumstances. But no sooner have they gone through the first part of their training (if not while passing through it) than their relative position is regulated by their conduct.

The man who by regularity and obedience shows that he is possessed of self-control and worthy of trust, is soon fixed upon to be placed above his comrades. But then comes almost immediately the question, whether his previous education has been sufficient to render him capable of filling the post for which he appears to be morally fitted. And unless he has acquired, or can acquire, some knowledge in reading, writing, and accounts, his promotion cannot go on. The want of such knowledge is often a bar to the advancement of the well-conducted private, but one which the regimental schools are now happily tending to remove. There is, however, still too much cause for lamenting the truth of a remark of the late Lord Hill, quoted by Mr. Neale, "that the soldier has much to combat in the way of constant temptation, and more in the want of early education; and that his deficiencies in this latter respect are deplorably and avowedly great."

The evils arising from the want of education are perhaps best shown by the benefits which have been derived from it by those who have been possessed of a certain amount of it before they entered the ranks. Of this there are several striking instances in the work before us.

The first is that of the late Brigadier-General Cureton. He was of an old family, long possessed of an hereditary estate in Shropshire, which his mother was obliged to obtain authority to sell after his father's death. At an early age he entered the militia of his native county as an ensign, and shortly after became a lieutenant. But he was speedily obliged, by pecuniary difficulties, to leave both this and another regiment of militia, when he enlisted, under the name of "Taylor," as a private in the 14th Light Dragoons. The officer of his troop, finding him a superior and educated young man, and steady, appointed him a "lance corporal," from which he gradually rose. He quitted England for the Peninsula in 1810, and in 1813, while holding the rank of serjeant, was recognised by one of Lord Wellington's staff, who had been his brother officer in the Shropshire militia. His conduct was so meritorious that, when a steady non-commissioned officer was required to manage the post-office arrangements, he was recommended by the colonel of his regiment, and at once appointed serjeant of the post to the head-quarters of the army. In 1814 he took his leave of the ranks, and of the name which he had assumed, and was gazetted to an ensigncy in the 40th foot.

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* "Risen from the Ranks; or, Conduct versus Caste." Pp. 341. London: Longmans, 1853.

When he had suddenly disappeared from the militia, it was believed that he had been drowned while bathing, from the circumstance of his regimentals having been left on the beach; and the first intimation that his mother had of his being still alive was the Gazette recording his commission. Athough he had received many severe wounds in the Peninsula he followed up his profession, and exchanged first into the 20th Light Dragoons, and then into the 16th Lancers, which he accompanied to India in 1822. He was present at the siege and capture of Bhurtpore, in 1825-26; and in the campaign in Affghanistan in 1839-40, he served as Assistant Adjutant-General, and was present at the capture of Ghuznee. In 1845 he was in command of the cavalry corps at Aliwal and Sobraon.

In Sir Harry Smith's despatch of the battle of Aliwal it is stated, that Brigadier Cureton's knowledge of the outpost duty, and the able manner in which he handles his cavalry, under the heaviest fire, rank him among the first cavalry officers of the age. At the battle of Sobraon similar praise was bestowed by the commander-in-chief. When he fell at Ramnuggur, in 1848, every honour was rendered to his memory. Although a strict disciplinarian, he is spoken of as one of the kindest and most thoughtful of commanding officers, and singularly considerate, in all points, of those under his command.

It is particularly mentioned, that, rapid as was his rise, no accusation was ever breathed of his indulging in unjust censure, or displaying overbearing demeanour. He fell in the presence of the same regiment, the 14th Light Dragoons, in which, thirty-eight years before, he had commenced his military career as a private. The interesting account in the volume before us, proves still more clearly than the foregoing imperfect sketch, that this distinguished officer owed his signal success in his profession, not to chance, but to education and uniform good conduct.

Another example of a similar nature is to be found in our author's account of Sir John Elley. He was the son of a paper-manufacturer, and was early articled to a solicitor in London; but, disliking the law, he enlisted as a private in the Blues, in 1789. His steadiness, quickness, devotion to his duties, and general merits as a soldier, soon attracted attention. In 1790 he was gazetted quarter-master, thus becoming a commissioned officer; and in the following year obtained a cornetcy. He rose regularly through the different grades, until, in 1813, he became full colonel in the army.

During the long and arduous struggle in the Peninsula, his judgment, tact, prompt decision, and dashing bravery, were conspicuous. For the particulars of his gallant career, especially at Salamanca and Waterloo, as also for the history of his favourite charger, we must refer our readers to Mr. Neale's pages. He became a major-general in 1819, and lieutenant-general in 1837. In 1835 he was returned as one of the members of Parliament for

Windsor, and he died in the beginning of 1839. Shortly before his death he justly observed, that "rash and hasty words are one of the soldier's besetting sins; and yet, considering that in war-time he is one moment all 'life and daring,' the next, [illegible] rebellion against Heaven. These points," he added, "appear [illegible] seems flat colours when life begins to wane."

In compliance with a request strongly expressed in his will, he was interred in St. George's Chapel at Windsor. Soon after the accession of William IV., at the great camp dinner at Windsor Castle, one of the earliest toasts proposed by the king was "The Army and Sir John Elley." In responding to it, Sir John referred to his early life, and to his having risen from the ranks, and alluded modestly to the obligations he was under to the army for the position he held, and for the circumstances in which he *then* found himself.

Here we have an instance of one who enlisted as a private in a celebrated regiment, raising himself, by the aid of a moderate education, and by sheer dint of merit, to the command of the same corps; becoming, afterwards, a representative of a royal borough in Parliament, and a guest at the table of royalty, where his health was proposed by his sovereign as a chief in whose person the British army was worthily represented; and, finally, obtaining a last resting-place where so many of the royal and the noble are interred.

In time of war it was not uncommon for men well brought up (of whom some had previously served as officers in the militia), to enter the regular army as volunteers, in the hope of being enabled by their education and good conduct to obtain commissions. Sir Hudson Lowe is related by our author to have thus commenced his military career. After having been previously an ensign in the East Devon militia, he served in the ranks for nearly three years as a volunteer, before he obtained an ensigncy. He attained to the rank of major-general in 1814, having risen in the army while serving chiefly in the Mediterranean, in a foreign corps in the pay of England. In this situation he became master of the French and Italian languages, and in 1814 he was attached to the army of the Allies, and received from several of the allied sovereigns and generals most honourable testimonies of his services. It was owing to these circumstances that he was considered well qualified to be intrusted with the safe custody of Buonaparte at St. Helena. His instructions from the British Government were, "to allow every indulgence to General Buonaparte, which may be compatible with the entire security of his person; that he should not by any means escape, or hold communication with any person whatsoever, excepting through your agency, must be your *unremitted care;* and those points being made sure, every resource and amusement which may serve to reconcile Buonaparte to his confinement may be permitted." To obey these orders in such a manner as to do his duty to his country, and at the same time reconcile the caged lion to his captivity, was obviously next to an impossibility. Our author mentions several instances of the extreme difficulty of Sir H. Lowe's position, and of the trials of self-control to which he was constantly exposed. The following anecdote is perhaps as good a proof as could be adduced of the kindness which he permitted to be shown towards his charge by those in whom he had perfect confidence; and it is also a valuable illustration of the self-protecting power of innocence. It appears that at one time the Longwood party, despairing of all success with Sir Hudson, had a scheme for bribing Lady Lowe, who had been heard to make some kind and commiserating remarks about Napoleon. A lady, to whom Lady Lowe had shown great kindness, was employed to see whether any favourable impression could be made, and *carte blanche* was given as to money. The lady, who, surprised at the length of the visit, once and again let the conversation drop. But still the anxious ambassadress sat and talked on. At last she rose, in utter desperation, and took her leave. On her return to the conspirators at Longwood, she said, "I could not find words to ask Lady Lowe to betray her husband. So kind, and frank, and truthful as she looked, I dared not approach her with such a proposal. No! no! I had miscalculated my own powers, and misunderstood her character. Forgive me!" It is the testimony of an eye-witness, that Sir H. Lowe's talent in unravelling the intricate plotting constantly going on at Longwood, and his vigilance in discharging his arduous and invidious duties, made him more enemies than any hastiness of temper, uncourteousness of demeanour, or severity in his measures, of which the world was taught to believe him guilty. His destiny seems a hard one, if, after having firmly carried out what he had reluctantly undertaken,—the safe custody of a baffled tyrant,—and obeyed instructions, he was then, as our author asserts, rewarded by coolness and neglect, where he had a right to calculate on cordiality and praise. He was thus treated, and died poor, although he had been charged with an amount of responsibility from which most men would have shrunk, and had performed a painful duty with sleepless vigilance, and had been exposed, from circumstances not of his own seeking, to an amount of obloquy almost without parallel in the annals of party. But such treatment, though he felt it, was borne patiently; he was once or twice heard to say:—"Were the past to be acted over again, I should make no change in my conduct. I received from my government certain instructions, and was charged rigidly to abide by them. I did so. Can a soldier obey orders too minutely?" Perhaps his case illustrates as forcibly as can be desired the benefits of education combined with good conduct. Thereby one, raised from the ranks, became such as to be considered fit to be intrusted with a charge of the greatest responsibility, and was enabled, after having faithfully discharged his trust, to submit patiently to unjust neglect and even obloquy by a consciousness of having performed his duty.

The volume before us contains other examples, all tending to illustrate the advantages of education, and the absolute necessity of good conduct in order to render those advantages conducive to permanent elevation of station. If our space had permitted we would have cited two or three examples which lead to the same conclusion, by showing that the absence of sound principle is alone sufficient to counterbalance all the advantages, as well of education and natural ability as of repeated opportunities of the most favourable kind. For these examples, however, we must refer our readers to the little work from which we have already taken so much.

In conclusion, we will only repeat, that these illustrations have been taken from the military profession, because it seems more easy in it than in any other calling to distinguish and trace the causes of elevation of station, and not because we suppose that such elevation is really in any degree less dependent in other pursuits than in it upon education combined with good conduct, or, in other words, upon elevation of character.

ELEMENTARY QUESTIONS IN GEOMETRY.*

1. Define a line. Give examples.
2. How many sorts of lines are there? Draw them.
3. What is the difference between a straight line and a curved line?
4. Explain concave and convex. Give examples illustrative of each.
5. Define a point. How many points has one line?
6. How many lines can pass directly up and down through one and the same point?
7. How many straight lines can there be between two points?
8. How many circular lines of equal length can there be between two points?
9. Give examples of slanting lines.
10. When are lines said to meet? When to intersect? Give examples of each.
11. Show in how many points two lines can touch.
12. Define a straight line.
13. Explain and illustrate vertical, horizontal, and parallel lines.
14. What is the difference between a straight line and a curved line?
15. Of curved lines between the two points, which is the longer, and why?
16. Show how two lines, not joined, may be drawn.
17. Define and illustrate converging and diverging lines.
18. Define the term angle. Show when two lines form an angle.
19. How many angles can be formed by two lines?
20. Show at how many points three straight lines can meet.
21. Try and make three straight lines to touch in four points.
22. Show in how many points four lines can join.
23. When is one angle equal to another?
24. Define and illustrate acute and obtuse angles.
25. Draw a square, tell the number of angles, and their names.
26. Form eight angles with four lines.
27. How many angles will three lines make meeting at two points?
28. Draw four right angles, each in a different position.
29. Upon what does the size of an angle depend?
30. Explain and illustrate adjacent angles.
31. Show that two acute and two obtuse angles are equal together to four right angles.
32. Give examples of each kind of angle.
33. Explain and illustrate vertical angles.
34. What is the vertical angle to a right angle? to an acute angle? &c.
35. Why is an obtuse angle vertical to an obtuse angle?

W. M'L.

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* To be answered in writing. The various figures to be drawn on the slates by the pupils.

Notices of Books.

CHURCH HISTORY IN ENGLAND, FROM THE EARLIEST TIMES TO THE PERIOD OF THE REFORMATION. BY THE REV. ARTHUR MARTINEAU, M.A., VICAR OF WHITKIRK. (Pp. 516.) (London: *Longmans*, 1853.)

There is perhaps no subject on which a greater amount of ignorance prevails amongst the otherwise well-informed portion of our countrymen than of the early history of the Church of England. One reason, probably, is, a deficiency of trustworthy works upon it of a popular character and moderate size, written in a fair and temperate spirit. We can honestly recommend the above volume as well calculated to meet this want. The style is very simple and clear, and at the same time interesting, but without any pretensions to brilliancy or ornament. The history commences with the earliest times of Christianity in this country, and comes down to the end of the reign of Henry VII. Many subjects are necessarily touched upon which in former times, no less than at the present day, have been the occasion of fierce controversy. In treating of them, however, the author has throughout evinced a desire, as professed in his preface, of not yielding to any degree of party feeling. If he should appear to some readers in two or three instances to have done so, they can hardly refuse the indulgence which he asks, as having fallen into it unconsciously. There seems, as he justly observes, to be no reason why we should not (for example) appreciate duly the noble characters of King Alfred and Archbishop Anselm, without extenuating the Romish tendencies of the former or approving of all the ecclesiastical principles of the latter. Nor is there any reason why a becoming thankfulness for the blessings of a church establishment, founded by the piety of our Anglo-Saxon ancestors, should make us blind to the errors of their theological system. The author's account of the rise and progress of the papal supremacy during the period before the mission of Augustine, shows in a concise and satisfactory manner, that during the earlier part of that period a supremacy of authority in the bishops of Rome had no existence; that, when asserted, it was denied and successfully resisted by churches of unimpeachable orthodoxy; and that all that can be fairly claimed by the Church of Rome in those ages was a primacy of rank due to the imperial city, or, at the highest, a patriarchal authority over part of the Western Church. And hence the important inference, that the circumstance of the British Church, being an integral part of the universal Church, instead of proving its dependence on Rome, proves directly the contrary. It is idle, as he remarks, to allege the concurrence of the British Bishops in framing the canons of a particular Council (the Council of Sardia) as a proof of the consent of the British Church to the doctrines which were engrafted on those canons not until a century later. The Pope having so recently attempted to re-establish his dominion in England, it is the more necessary to direct attention to the grounds upon which its pretended antiquity rests, and to this end to enable readers to trace historically the growth of the Papal supremacy in the period before Augustine's mission. The author has shown much learning and care in his account of the penitential system of the Anglo-Saxon Church, and of the commencement of Norman rule in this country. His account of synods, and of the different kinds of them in the Anglo-Saxon times, is deserving of similar commendation. It would, perhaps, have been more in conformity with the fair and temperate spirit in which this volume is manifestly written, if the author, instead of saying that the leading principle of mediæval religion seems to be that man can by his own works merit, as a matter of desert, eternal salvation from God, had rather restricted himself to the more safe and charitable statement, that such was unhappily its general tendency, as was most apparent at the period of the Reformation. This, too, would have been more consistent with the spirit in which he speaks in the very next page, where he says that whatever errors of doctrine may have prevailed in the Anglo-Saxon Church, they are to be traced rather to the general ignorance of the times concerning which we write, than to any deliberate intention on the part of ecclesiastical rulers to keep the people in darkness. There are, doubtless, other passages open to similar remarks, but the work may safely be recommended as, upon the whole, a very good and useful one, especially for educational purposes.

THE NATIONAL MISCELLANY. NOS. I.—III. (London: *J. H. Parker*, 1853.)

THE first three Numbers of this new Monthly now before us are such as justly entitle it to our decided approbation. Each Number contains from eight to ten short and exceedingly well-written papers upon subjects of general and present interest. The type is unusually good for a publication of this description, and peculiarly recommends "The National Miscellany" to those who are desirous of spending half-an-hour in profitable reading on a railway, without injury to the eyes. It is also well suited for the reading-room of a Mechanics' Institute, being devoted to secular subjects, and at the same time calculated to improve the mind and elevate the character of its readers. Upon this account it may safely and beneficially be placed in the hands of the young, to whom it will afford much interesting information upon the ordinary topics of general conversation. We trust its publisher will meet with the patronage which he deserves in thus adding to our periodical literature a cheap and well-written Magazine, the pages of which he promises shall not be stained with a line containing lax or evil principles.

THE ART OF QUESTIONING; OR, A SHORT ANALYSIS OF THE INTERROGATORY METHODS OF INSTRUCTION, DESIGNED FOR THE USE OF TEACHERS, PUPIL-TEACHERS, AND MONITORS. BY. W. T. YOUNG, RESIDENT MASTER, ROYAL HIBERNIAN MILITARY SCHOOL. (Pp. 48. Dublin: *W. Curry*, 1853.)

IN this little work (a portion of which appeared in this journal) the author has drawn out more at length and illustrated by examples some useful remarks on questioning, which appeared in 1851 in several Numbers of our journal. It is no unfavourable symptom of progress in teaching, to observe among school-books the gradual disappearance of ready-made questions and answers, the popularity of which, some years ago, arose from the neglect of a frequent extempore questioning in schools. It is a first requisite in questioning, that the knowledge of the subject be accurate and minute, as in the examination of a class the teacher is not less tested than his pupils. Every question should be direct and explicit, and should rather suggest the answer than leave the pupil to consider, not what the answer should be, but what the question itself really is. In these pages certain errors in questioning are pointed out, and then some exercises are added, containing the errors to be corrected. In almost every case questioning should partake more of the nature of an easy conversation than of a series of formal interrogatories. But this will require care and attention on the part of the teacher, who will generally find less difficulty in communicating knowledge than in drawing out the knowledge acquired, and by doing which the pupil is made to think. To make the child conscious of his own ability to think, and so to lead him by little and little to self-reliance and reflection, are the first important steps in the work of education. To assist the teacher in doing this is the object of "The Art of Questioning."

THE THIRD GREEK BOOK. THE FOURTH GREEK BOOK. EDITED BY T. K. ARNOLD, M.A. (London: *Rivington.*)

THE first of these reading-books contains extracts from Xenophon's Cyropædia. The narrative is not continuous, but consists of disconnected paragraphs, anecdotes, &c. Xenophon is well adapted to serve as a reading-book for tolerably young scholars : his diction is pure Attic—and with this, according to our view, the learner ought first to be acquainted, not with the Epic and Ionic—and his style is easy and simple, and the Cyropædia in particular is likely, from its anecdotal character, to prove interesting. There are notes appended, neither particularly good nor particularly bad, and a glossarial index, containing the words which occur in the text. Besides, there are reprinted here the syntactic rules from the editor's Elementary Greek Grammar, constituting by far the most useless portion of the book. It may be advisable to make a very young scholar commit to memory half a dozen simple rules of syntax, to impress them on his mind, but we cannot see the use of writing elaborate rules, which can only be appreciated by more advanced scholars in Latin. The rules are too long and complicated to be learned, and, through the medium of indifferent Latin, a hundred times harder to understand clearly.

The Fourth Greek Book contains the last four books of Xenophon's Anabasis, which describe the immortal retreat of the brave ten thousand, under the command of the narrator. The notes are chiefly from Hertlein, and are supplied throughout with references to Mr. Arnold's shorter Greek Grammar. We have observed very great looseness in the notes, as regards the distinction between different tenses; presents are asserted to have a past force, and imperfects that of pluperfects; whether this is due to Hertlein or Mr. Browne we are not able to say.

THIRTEEN SATIRES OF JUVENAL, WITH ENGLISH NOTES. BY J. E. B. MAYOR, M.A. (Cambridge: *Macmillan & Co.*)

FROM the preface we learn that Mr. Mayor originally intended to produce a complete edition of this poet for the use of scholars, but, for reasons unnecessary to mention, undertook to furnish a less elaborate work, for the use of less advanced students, and schools generally. It appears to us a question whether the author of the present volume has not failed to observe the distinction between the two classes of publication mentioned above. That this work is a most scholar-like one we gladly admit. Those who have been enabled by opportunities to form an estimate of Mr. Mayor's scholarship, would have guaranteed, even before publication, the existence of this quality. But it is not equally clear to us that the notes are, on the whole, quite suited for those for whom the book is professedly intended. There is rather a waste of learning displayed in the way of citations from other authors, and a superfluity of references, which Mr. Mayor may take our word for will never be referred to. Boys generally have not very many books at command; and therefore, in a volume intended for their use, a multiplicity of references to different authorities is unnecessary and useless. Besides, Mr. Mayor sets out with the theory that certain authors, Seneca and others—about whose merits one may have one's own opinion—are by classical men generally placed in a back-ground unsuited to their deserts. Accordingly they are brought into a conspicuous position in these notes, the author confessing a weakness for the writers of the silver age, in preference, we rather think, to those of the golden. Indeed, a suggestion is made in the preface, that certain authors now embraced in the recognised Cambridge course should be discarded, and others, Seneca, Epictetus, Dio, Ammianus, and others admitted into the vacant niches—to secure a wider compass of reading. Now, a classical man's researches are surely not considered bounded by the tripos; *that* is not the goal of his reading, it is rather the first stage on his journey. Is it not, then, reasonable that at first he should confine himself to the study of authors who confessedly wrote in the golden period of literature, and perfect himself first in their phraseology and usages, and afterwards, if his inclinations prompt him, take up those silver writers to complete the cycle of his reading? However this may be—and of course on this point opinions may differ—there can be no variety of judgment when the mere schoolboy is concerned; and for him this book is intended. Even Mr. Mayor can hardly propose to use these authors above mentioned in *his* case. Is the young scholar to leave the well undefiled for the doubtful waters? Is he to turn his attention chiefly to Seneca and Dio, and Valerius Maximus, Suetonius, and so on? Then, why indulge in such unbounded quotations from them in a school-book—quotations from them chiefly, we might almost say? This we consider a radical defect, or rather a radical uselessness in the book. We turn, for instance, to the tenth Satire, and here we find Mr. Mayor absolutely revelling in long quotations from Seneca, Valerius Maximus, Petronius, Augustine, Appian, and the like, and full of recondite allusions to authors and books utterly out of the reach of younger students. In proof of this we merely refer the reader to the list of additions and corrections on pages xviii. and xix., from which he will gather an idea of the unnecessary parade of learning. Apart from this fault, however, we must say the notes, as far as they illustrate the meaning of the author, are very satisfactory—difficulties are not passed over, and all words and phrases are most elaborately explained. Perhaps if there be any defect, it is in the sparing adoption of explanations in *English* of difficult passages, and the general sense. For instance, in Sat. 10, l. 249, there occurs the difficult expression, "suos jam dextra computat annos;" this is illustrated by passages from Hieronymus and others, but no explanation in English is offered, and consequently we fancy few boys would be much the wiser for the note. We might say the same with reference to line 116, "uno parcam colet asse Minervam;" this is illustrated, but hardly clearly explained as to the general meaning of the expression. Such help we know by experience to be required by the generality of school-boys, and such notes to be exceedingly useful, rather more so than one, for instance, in Mr. Mayor's book on the words "Gadib*us us*que" in the first line of the tenth Satire, on which extraordinary and portentous alliteration the reader is referred to line 122, and there finds a most learned string of references to similar alliterations, and the notes of editors thereupon. This seems to us a ludicrous instance of misapplied learning, rivalling that on which Bishop Thirlwall makes a playful remark in volume iv. of his History of Greece; the anxiety, namely, of learned men to adjust to the Iambic form the famous despatch sent to Sparta after the death of Mindarus, by the insertion of some particle of due length, as though it had been consolation to the wretched to express their wretchedness in poetic doggerel. The text, we may add, is that of Otto Jahn.

SYNTAX OF THE GREEK LANGUAGE. BY DR. MADVIG. TRANSLATED BY THE REV. H. BROWNE, AND EDITED BY T. K. ARNOLD. (London: *Rivington.*)

OF this book we are able to speak in the most unqualified terms of praise. Dr. Madvig's Latin Grammar has been for some time well known in this country, and much valued as an accurate and well-arranged treatise. In the present work the learned doctor has applied the same principles and method to the elucidation of the Greek syntax. This is a difficult subject, difficult not only in itself, but difficult as regards its treatment. This difficulty Dr. Madvig has most ably overcome; he is exceedingly clear and distinct in his conceptions and enunciations of fundamental positions and principles, and free from all subtle disquisitions which only darken counsel. This book is intended for schools, and "for schools" has been constantly before the eyes of the writer, for he has always aimed at simplicity and clearness. He has also very properly directed his attention to the Attic dialect especially: in the syntax of this the young scholar ought first to be initiated; the others ought undoubtedly to be postponed to a later period. The work begins with a chapter on the agreement of subject and predicate, and passes on to the article, and the cases of nouns; and we may mention the chapter on the syntax of the genitive as particularly able and full. After the prepositions, adjective, and pronouns, we come to the verb, and here the writer's skill is most pre-eminently displayed. The optative mood is confessedly a difficult subject, and the optative of the oratio obliqua not the least hard portion of it. As far as the subject admits of clearness, no treatise was ever, we think, so clear as this, or can ever be more so. What difficulty now remains is the inherent difficulty of the subject, not of its treatment; and higher praise than this cannot be awarded. There are also chapters on the connection of sentences, the negatives, certain irregularities of construction, and on the order of words and sentences. In all these a master's hand is discerned: indeed we may repeat what we said in substance at first, that we have never seen Greek syntax treated so completely in accordance with the requirements of younger students, and indeed all students. Every point that occurred to us as requiring discussion or mention we have looked for, and invariably found treated of satisfactorily and fully. We cannot refrain from again expressing our admiration of the work, and giving utterance to a hope that it will obtain a warm reception from the directors of classical learning in this country.

AN ENGLISH-LATIN DICTIONARY. ABRIDGED FROM RIDDLE AND ARNOLD. BY REV. J. C. EBDEN. (London: *Longman & Co.*)

THOSE who were at school a dozen or twenty years ago must often have felt the want of a good English-Latin dictionary, to use in their composition. There certainly were such lexicons, but they were excessively meagre, and without, as far as we remember, any pretensions to accuracy or detail; in fact, they were of little use except in the way of mere word-rendering, without any attempt at distinctions between the various words put down, or the introduction of phrases and really classical expressions and idioms. The large work of Messrs. Riddle and Arnold entirely remedied the deficiency so often felt in this department; their English-Latin Dictionary is very copious, and—for we have ourselves tested it largely—rich in phraseology and idiomatic renderings.' But it was a somewhat expensive book, and so precluded from such extensive adoption as it well merited. To obviate this, Mr. Ebden has issued the above smaller work, abridged from the larger, for the use of schools, and all cases where the original work was too large and expensive. Still, this book, although of course very much less in size than the larger work, is by means of small type, and close arrangement, sufficiently copious for those for whom it is intended, and immeasurably superior to the older dictionaries we have alluded to. For instance, under the word "hand," we find considerably more than two very closely-printed columns, containing phrases in which the word "hand," in various combination, occurs, really classical phrases, not seldom with a mention of the writer in whose works they are found. By certain marks also, the poetic, and post-Augustan expressions are notified, and so the learner is prevented from disfiguring his composition with too showy or objectionable phraseology. The vocabulary is very full, so that scarcely any word required by the young scholar is omitted. Indeed, we think many words admitted might have been as well left out, and thus, more space having been gained, the type might have been a trifle larger; at present it is very small, and by gas light or candle, likely to try the eyes of its users. Such words as can only be rendered by elaborate and clumsy paraphrases, as having no counterparts in Latin, might have been perhaps judiciously removed; such words, for instance, as camelot, calvinist, candlemas, and the like.

ANSWERS TO THE MATHEMATICAL QUESTIONS.

QUES. 183.—*Proposed by Amicus.*

$$\left.\begin{array}{lr} \text{Given } x^3 - y^3 = x^2 + y^2 \quad . \quad . \quad . & (1) \\ \text{and } x^2 - y^2 = x\,y \quad . \quad . \quad . \quad . & (2) \end{array}\right\} \text{ to find } x \text{ and } y.$$

Answered by Mr. W. Godward, jun., Mr. John Godward, and A.M.

Multiplying (2) by x and y we have

$$x^3 - x\,y^2 = x^2\,y \text{ and } x^2\,y - y^3 = x\,y^2,$$

$$\therefore x^3 - y^3 = 2\,x\,y^2;$$

$$\text{hence from (1) } x^2 + y^2 = 2\,x\,y^2 \quad . \quad . \quad . \quad . \quad . \quad . \qquad (3)$$

Squaring (2) and adding $4\,x^2\,y^2$ to both sides

$$x^4 + 2\,x^2\,y^2 + y^4 = 5\,x^2\,y^2,$$

$$\therefore x^2 + y^2 = x\,y\,\sqrt{5} \quad . \quad . \quad . \quad . \quad . \quad . \qquad (4)$$

from (3) and (4) $2\,x\,y^2 = x\,y\,\sqrt{5}$, or $y = \frac{1}{2}\sqrt{5}$.

Adding (2) and (4), $2\,x^2 = x\,y\,(\sqrt{5} + 1)$

$$\therefore x = \tfrac{1}{2}\,y\,(\sqrt{5} + 1) = \tfrac{1}{4}\,(5 + \sqrt{5})$$

QUES. 184.—*Proposed by N'Importe.*

Given the line bisecting one of the equal angles of an isosceles triangle, and terminating in the opposite side, and the line drawn from the extremity of this line parallel to the base and terminating in the other side, to construct the triangle.

Answered by E', Mr. W. H. Levy, and Mr. Rutter.

Make B D = the given line bisecting one of the equal angles at the base, on B D describe the isosceles triangle B E D having the equal sides B E, D E each equal to the given line parallel to the base, produce B E to C, and make the angle E D C = D E C. Lastly, draw B A parallel to E D meeting C D produced in A; then A C B will be the triangle required.

Because D E is parallel to A B and equal to B E, we have angle A B D = B D E = D B E, therefore B D bisects the angle A B C; also since the angle B A C = C D E = C E D = A B C, the triangle A B C is isosceles.

QUES. 185.—*Proposed by Mr. W. H. Levy, Shalbourne.*

If the greatest cylinder be cut out of a given paraboloid, the greatest out of the remaining paraboloid, and the greatest again out of the next remaining paraboloid, &c., *ad infinitum;* then will the sum of all the cylinders so cut out be equal to two-thirds of the paraboloid. Required proof.

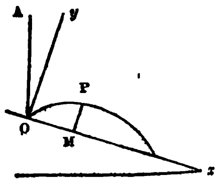
Answered by E'., A. M., Mr. W. Godward, jun., Mr. Levy, and Mr. Rutter.

Let a = radius of the base of the paraboloid, and b = its altitude, then (see solution to question 161) the altitude of the first cylinder = $\frac{1}{2}b$, the square of the radius of its base = $\frac{1}{2}a^2$, and its content C = $\frac{1}{4}a^2 b\pi$. Hence, since both the height and the square of the radius of the base of the next paraboloid are $\frac{1}{2}$ of that preceding, the contents are as $\frac{1}{4}$ to 1. Therefore the sum of all the cylinders = $C\left(1 + \frac{1}{4} + \frac{1}{16} + \frac{1}{64} + \textit{ad. int.}\right) = \frac{4}{3}C = \frac{4}{3} \times \frac{1}{4}a^2 b\pi = \frac{1}{3}a^2 b\pi = \frac{2}{3}$ of the paraboloid (see Tate's Calculus, page 200).

QUES. 186.—*Proposed by A. G. P., Herts.*

A ball of elasticity e, is let fall from a given point above an inclined plane; find the range on the plane after resilition.

Answered by A. G. P., Herts, and Amicus.



Take O x, which is intended to represent the plane, for the axis of x, and O y perpendicular to it for the axis of y, and let O be the point of impact; draw O A vertical, and let it = h, and let $\angle$ A O y (which is equal to the angle O x makes with the horizon) = α. Then the velocity of the ball at O = $\sqrt{2gh}$, and therefore the components of the velocity after reflection parallel to O x and O y are $\sqrt{2gh}.\sin\alpha$ and $e\sqrt{2gh}.\cos\alpha$ (see art. 210, Tate's Mech. Phil.), the spaces corresponding to these velocities for the time t are $t\sqrt{2gh}.\sin\alpha$ and $e\,t\sqrt{2gh}.\cos\alpha$; also the spaces due to gravity for the time t in the directions of O x and O y are $\frac{1}{2}gt^2\sin\alpha$ and $-\frac{1}{2}gt^2\cos\alpha$. Hence if P be the position of the ball at the time t, and O M = x, M P = y, we have, by Newton's second law,

$$x = t\sin\alpha\left(\sqrt{2gh} + \tfrac{1}{2}gt\right) \quad . \quad . \quad . \quad . \quad (1)$$

$$y = t\cos\alpha\left(e\sqrt{2gh} - \tfrac{1}{2}gt\right) \quad . \quad . \quad . \quad . \quad (2)$$

When $y = 0$, $x = \text{R}$, the range; hence from (2) $t = \frac{2e}{g}\sqrt{2gh}$, and from (1)

$$\text{R} = 4he(1 + e)\sin\alpha.$$

LIST OF MATHEMATICAL ANSWERS.

Amicus, ans. 183, 186; Samuel Dyer, Wanstead, ans. 184; E′, Great Stukeley, ans. 183, 184, 185, 186; John Godward, Chelsea, ans. 183, 184; William Godward, jun., Chelsea, ans. 183, 184, 185, 186; W. H. Levy, Shalbourne, ans. 183, 184, 185, 186; James Lovell, Chatteris, ans. 184; A. M., ans. 183, 184, 185, 186; N'Importe, ans. 184; A. G. P., Herts. ans. 186; and E. Rutter, Sunderland, ans. 183, 184, 185, 186.

NEW QUESTIONS,

To be answered in our Number for October, 1853.

Ques. 187.—*Proposed by Mr. Thomas Ambler.*

Two vessels, A and B, contain each a mixture of wine and water; in A the wine : water :: 1 : 4, and in B the wine : water :: 3 : 7. How much must be taken from each vessel so as to have a mixture of 7 gallons of wine and 20 of water?

Ques. 188.—*Proposed by N' Importe.*

If from a point in either side of a right angled triangle, a perpendicular be drawn to the hypothenuse; show that the rectangle of the segments of the hypothenuse is equal to the rectangle of the segments of the side, together with the square of the said perpendicular.

Ques. 189.—*Proposed by Mr. John Thompson.*

If A^1, B^1, C^1, be the angles which the sides of a triangle subtend at the centre of the inscribed circle, then will

$$4 \sin A^1. \sin B^1. \sin C^1. = \sin A + \sin B + \sin C.$$

Ques. 190.—*From Earnshaw's Dynamics.*

A B is the vertical diameter of a circle. A perfectly elastic ball descends down the chord A C, and being reflected by the plane B C, describes its path as a projectile; show that the ball will strike the circle at the opposite extremity of the diameter C D.

⁂ It is particularly requested that all mathematical contributions be forwarded, at *latest*, by the 20th of each month.

UNIVERSITY EDUCATION—THE CLASSICS.

That change in the subjects of education for the upper class which is now in progress at the Universities, though it goes on silently in comparison with political events, will look great in history. When such a change last took place, the old philosophy of the middle ages gave way to the new classical learning. Now, classical learning, in its turn, yields part of its empire to the new philosophy and the new science. When the study of the classics was introduced, the educational Tories of the day expressed their alarm in jeremiads as dolorous as those which are uttered by the educational Tories of the present day because that study is about to be partly superseded. All really masculine cultivation of the intellect, all prospect of producing eminent men, either in the Church or State, seemed to them to be at an end when youths ceased to be trained exclusively in Duns Scotus and the Aristotelian physics. No doubt they brandished the great names of the middle ages, as their counterparts now brandish those of Statesmen who have sown their wild oats at one of our Universities. Let us, then, take courage. We, in our turn, shall be ancestors, and what is now our "rash innovation" will become our "wisdom."

It certainly needed a very strong faith to believe that a man's life from six to twenty-one was well spent in acquiring a very imperfect knowledge of two dead languages, which he was to forget again the moment he left College. Yet this was the real state of the case. People may sneer at a little knowledge of physical science, or a little knowledge of political economy, as superficial; but any real and lasting knowledge of either, however limited, will be profound compared with the knowledge possessed by an ordinary B.A. of Latin and Greek. To be able, with great difficulty, to construe two or three books at an examination, with the addition, at Oxford only, of the power of writing a little bit of bad Latin, without more than two or three gross blunders—such was the education of a gentleman. Anything like a general knowledge of the languages, of their literature, any genuine feeling of interest in the classic authors, or any desire to open one of them after he had ceased to be necessary for an examination—these were things confined to candidates for honours, and were not over common even among them. To acquire a real familiarity with a dead language is a very difficult thing, and demands faculties which, though not very high, are rare; while, in the meantime, there is nothing in the subject to reward the learner, and to carry him over the aversion which nine men out of ten naturally feel to hard study. Strong emulation, which was fast becoming excessive, stimulated the classmen; but the University education of the "passman" consisted in cramming up, by two fierce but short-lived efforts,—first, the books required for his "Little-go," and then those required for his "Great-go." After the last achievement, he left College without ever having really tasted knowledge, or acquired any intellectual habits or tendencies. For a few months, he retained a fading reminiscence of one or two Greek and Latin books, of some grammatical forms, and, if he had been at Cambridge, of "poll" mathematics; but when he lost this—which he generally did before his College bills were paid—it was difficult to say in what respect his intellect was the better for having been at the University. Such was the system, to impeach which was to be a utilitarian, a materialist, and something worse. It was the only system, we were assured, that could form the character of the English gentleman and Statesman. The political and social conduct of the governing class in England during the last century, and the tremendous legacies which the Pittites and Eldonites have bequeathed to us, show how well the "education of a gentleman" did its work.

There comes, however, a smiling optimist, who tells us that Greek and Latin are the best possible training for the human mind. But it was mere accident which determined that Greek and Latin should be the best possible training for the human mind at Oxford, while mathematics were the best possible training for the human mind at Cambridge. It was mere accident which determined that Greek and Latin should be the best possible training for the human mind at all. These languages were adopted as the subject of polite education, not because ancient authors were a better training than modern, nor because philology was a better training than physics, but simply because the Greek and Latin philosophers, historians, orators, and poets were in that day the only philosophers, historians, orators, and poets worth reading. The venerated name *Literæ Humaniores* itself witnesses against those who take it in vain, and proves that a dry philology and a dead language were not the objects that determined the choice of our wise ancestors. We doubt whether they even realized the fact that Latin and Greek were dead languages; for they talked Latin, and tried to talk Greek. As to philology, the founders of classical education can scarcely be said to have known what it was. Their grammars were unphilosophical, and their etymologies were absurd. Nor, if they had known what philology was, are we sure that they would have classed it among humanising studies; for certainly its effect has not been humanising on its great professors. Porson was a sot—Bentley was a brute—Scaliger was a pedant of the grossest kind. For training a pedant, indeed, there can be nothing like the study of accidental forms and arbitrary idioms. Whenever the name pedant is mentioned, a teacher of classics rises to the mind. On the other hand, many of the great names of physical and mathematical science rank amongst the noblest, most capacious, and most exalted intellects of the human race. What are all the Porsons in creation, in point of intellectual grandeur, to a Pascal, a Kepler, or a Bacon?

The classics will live and reign by their own greatness, and scholars will always rise to minister to them—perhaps with all the more effect when scholarship becomes a special branch of knowledge, instead of a universal ignorance. We have little doubt, too, that a practical power of reading and enjoying that which is readable and enjoyable in the ancients may be more easily acquired, and acquired by a greater number of persons, than at present. It is only necessary to put Greek and Latin in by the right method, instead of putting them in "at the right end." But Providence, through the advancement of the human mind, has given us treasures which Aristotle only saw from afar, and into which Tacitus would have stooped down to look. Mr. Cobden has said that one number of the *Times* contained more valuable knowledge than all the historical works of Thucydides; and though the remark, like many of his assertions, was rough in form, it was, like most of them, true in substance. Mr. Maitland, a shrewd observer of the intellect of his age, has in like manner noticed the great decline of interest in the classics since the days of Parson Adams and his pocket Æschylus. This diminution of the intrinsic value of the classics, and of the interest taken in them, is of course not decisive against their superiority as instruments of education; but it is a very material element in the question, because, as we have remarked, their adoption was, in the first instance, owing to their intrinsic value and interest.

We do not put the case on utilitarian grounds. If the classical course is satisfactory as a mental training—if it generates in the students generally, industry, intellectual refinement, and the love of knowledge—we would not have it altered merely because the information which it imparts is not convertible into money. But if it does not impart useful information, and if at the same time it fails to produce intellectual habits in the generality of men, the examples of a few men of talent, who would become intellectual under almost any system, will not avail to exempt it from revision. The demands of the age, when opposed to higher considerations, ought to be resisted; and the power of offering such resistance is the great advantage which the Universities derive from their endowments. But a reconsideration of the classical system seems to us to be not only the demand of the age, but of reason. We are sincerely glad to see that the new Chancellor of Oxford is disposed to take a liberal view of this question; and we would only remind him that the "authorities" to be consulted on University education are not only the heads of houses but the educated world.—*Morning Chronicle.*

SUPERIORITY OF FEMALE SCHOOLS.

The following are extracts from the General Report of the Rev. T. W. Marshall, her Majesty's Inspector of Roman Catholic Schools:—

"In considering the points which appear most worthy of being submitted to public attention, both as affording the most distinct evidence of the actual condition and progress of the schools under my inspection, and as indicating the share which the promoters of elementary [Roman] Catholic schools are now taking in the general work of popular education, there is one which so far exceeds all others in interest and importance, that I cannot hesitate about the place which it should occupy in this Report. It has been constantly present to my mind during the whole of the past year, and appears to me to claim, almost to the exclusion of every other, the notice of all who are interested in the further improvement and extension of [Roman] Catholic schools. The fact to which I refer, the causes of which it will be expedient to investigate, is the *immeasurable superiority* of the female schools, taken as a whole, over those which are frequented by boys. . . . . . .

"If I were asked to state what is the special merit of the class of schools to which I am referring, and what gives them their peculiar value and importance, I should say that they are the *only* schools, so far as my own experience extends, in which the true aim and end of Christian education is *fully* accomplished. It would be easy to refer to many boys' schools in which the instruction is of a very high order, the discipline entirely satisfactory, and the general moral tone extremely pleasing; and I am bound to add, that in a considerable number the amount of religious knowledge is really wonderful; but in the girls' schools, taught by members of religious communities, all this is done *and a great deal more*, which elsewhere is either not even attempted, or abandoned after trial as unattainable.

"In many cases I have been able to assist the managers of boys' schools, fatigued and dispirited by a series of incompetent masters, in obtaining the services of highly-trained and skilful teachers, especially from the model school in Dublin. But when the time has arrived for inquiring about the *results* of their labours, I have almost always received the same report: 'You see how much progress has been made in all the secular subjects, and how many signs there are of increased intellectual life; there is also much improvement (this is sometimes but not *always* added) in the habits and dispositions of the children; but, satisfactory as this is, we get no further; our master cannot do for the boys, with all his efforts, what is done in the girls' school, apparently without any effort at all.' And now *what* is that which, by universal testimony, is generally despaired of in the one class of schools, and almost always accomplished in the other?

"I conceive that it consists in these two things; first, the cultivation of the intellect, and the communication of knowledge, solely with reference to their legitimate use and value, the fuller comprehension of Divine things; and secondly, the effective discipline and education of the whole character, in all its complex relations, thoughts, feelings, habits, and affections.

"A few illustrations of both these points may not be wholly without interest, and they may be furnished without any risk of running into familiar details, for which this is not a suitable place.

"With respect to the first point, the character of the *intellectual* training in 'religious' schools, what appears to be aimed at is this: that all secular truths and ideas shall, as far as possible, be presented to the minds of the children in connexion with those of a higher order, wherever any natural relation can be shown to exist between them; and that religious thoughts shall thus be made not merely to run parallel with, and give a colour to the whole range of secular studies, but to serve, so to speak, as their basis and foundation.

"Thus, in communicating to children the first general notions of the science of *grammar*, a subject which, as usually taught, does not appear to connect itself very readily with religious ideas, I have heard a gallery lesson given on different occasions, of which the following outline will show the general character.

"Beginning with the simplest truth, that man alone possesses the power of speech, which is denied to animals, this faculty is explained both as a distinct and eminent gift of the Creator, and as respects the uses to which He wished it to be applied. A skilful teacher will often so handle this subject as both powerfully to interest the class, and as a natural introduction to the explanation of words as symbols and representations of thoughts. It is then observed that man was not only endowed with the power of speech, but that a definite *language* was given him to speak: and further, that, as unity is the special mark of all the Divine works, he received *one* language, and not many; and that it was human wilfulness, which is always opposed to unity, which occasioned the introduction of new forms of speech, not as a privilege, but as a punishment. Reflections of this kind, which children readily comprehend and appreciate, serve both to awaken attention and to prepare the way for the more technical subject of the construction and arrangement of words. It is not necessary to give any account of the various steps by which this final point of the lesson is reached, as it is not so much my purpose to show that the outlines and theory of grammar are taught with skill, as to give an illustration of the manner in which truths of a higher order are employed, naturally and judiciously, to lend their own interest and importance to others of a different nature. This is the essential characteristic of the *instruction* in 'religious' schools. . . . . . .

"No one can be indifferent to the success of an educational system which is likely to affect, more and more, the whole future destinies of a considerable and hitherto neglected element of our population. And that I may give, in justification of this remark, an adequate example, I will beg leave to refer at once to a school lately opened in the very heart of one of the most notoriously corrupt and immoral districts in England, upon the state of which an interesting pamphlet was published not long since by a distinguished clergyman of the Established Church. I refer to a well-known spot in Liverpool, abandoned till recently as the natural domain and appropriate receptacle of the refuse of a great city. In the worst street of this locality, in which, amongst other centres of corruption, were five infamous houses, and where, as I was informed, even the police ventured with reluctance, contenting themselves with a glance down the street, a school of large dimensions and excellent architectural character and arrangements was erected during the course of last summer. The school was committed by the founder, the Rev. Thomas Newsham, a gentleman to whom the progress of popular education in Liverpool owes a great deal, to the charge of a few religious ladies, all very young, but of whom the superior is probably one of the most sagacious and accomplished teachers of our time. It was a mission of no common peril and difficulty; but they who imposed the task knew what they were about, and that the feeble hands to which it was intrusted were able to contend with any form of evil, however menacing and formidable, which could cross their path. I visited the school about four months after its operations had commenced. It then presented the aspect of a long-established and highly-organized school; and the deportment of the children, who were not only thoroughly subdued and disciplined, but completely under the control and influence of the teachers, was even *unusually* gentle and pleasing. When the school was opened the greater part of the children could not read *at all.* At the date of my visit the second, third, and fourth classes could read the *second*, and the first class the *third* book of the Irish Commissioners. In June, very few could either make or read a figure; in September, good progress had been made in the simple rules of arithmetic. The first four classes had acquired a fair knowledge of the elements of grammar and geography, and Scripture history had been taught with much success. But this was of little importance compared with the *whole* work effected by the same agency. Of the five houses alluded to above, three had been closed within a few weeks after the school opened, and the persuasive ministry of these humble women commenced; and the other two daily sent their younger inmates for instruction. My attention was particularly called to the children of this class; and if I do not attempt to express my admiration at the astonishing work accomplished in them, in the face of moral difficulties which no language can exaggerate, it is because the emotions which such a spectacle excites are hardly capable of translation into words. This instance is perhaps an extreme one—the ladies themselves seemed to consider it so—but it is far from standing alone; and I wish the managers of [Roman] Catholic schools to reflect whether the ordinary class of teachers whom they sometimes employ can produce anything like it. Is it not a striking proof, amongst a thousand others, of the truth of that memorable declaration of M. Thiers, a very unsuspicious authority on such a subject, who not long ago exclaimed, in an assembly as little disposed as himself to tolerate exaggeration in this matter, 'Pour être maître d'école, il faut une humilité, une abnégation dont un laïque est rarement capable . . . . l'esprit, le dévouement d'un laïque n'y suffit pas?' And M. Thiers, in speaking thus, was retracting and disavowing earlier impressions, corrected by a much larger amount of experience and observation than most men possess. He had, indeed, just been giving his opinion on the same occasion, in words which have since become celebrated, of the real character and influence of the 40,000 official teachers of the communal schools of France. It was after diligently contemplating the immense and unparalleled difficulties which the state of modern society has created for teachers, and the measure of their success in dealing with them, that he was constrained to say, 'Le dévouement d'un laïque n'y suffit pas.' . . . .

"Immense efforts are being made in this country to improve and extend popular education, and they are naturally aided by the succour and encouragement of the Government, which evidently could not abstain from taking a certain share in such a work without abdicating one of its most important functions. But these efforts must be supposed to have a *definite aim.* If vast sums of money are expended in the erection of school buildings, the training of teachers, and the supply of apparatus, all this is done in order to effect a particular object; and that object must be the moral, social, and religious improvement of the working classes. No lower aim could inspire so many labours, nor justify so many sacrifices. For, that the children of the poor should possess more or less knowledge of grammar or geography is really, in itself, a matter of very small concern either to themselves or to the state; but that they should be so trained as to become hereafter lovers of justice, purity, patience, and industry—to be, in a word, good men and good citizens,—this is worthy of any expenditure, however costly, of any toil, however laborious. And it is the measure of success obtained in *this* respect which all who are employed as agents in the general work should endeavour to ascertain, and their testimony to which the public, who make sacrifices to promote it, will demand before any other information whatever.

"It is a great satisfaction to me to be able to report, speaking only of the limited sphere within which my own duties are performed, that the success already obtained has been *immense.* Much remains to be done, but what has been accomplished in so many places is a sufficient guarantee, that, by the same machinery, it will be effected in others.

"Every one knows how much easier it is to *instruct* the children of the working classes with skill, however obtuse and corrupt they may be from previous neglect and evil associations, than to accomplish those more delicate operations which properly belong to *education;* and whoever has tried to civilize and refine rude natures, to root out vile and long-indulged habits, to extinguish and replace wilfulness by docility, obstinacy by meekness, restlessness by patience, and self-love by self-contempt, has attempted a task which makes perhaps a larger demand upon human wisdom and perseverance than any other. Yet this is what *is* done, and upon a very large scale, in many of the schools of which I have been speaking.

"Very often during the last four years I have seen examples of this incomparable work of charity, such as no lapse of time can efface from my memory, and which have produced upon my mind some of the most powerful impressions it has ever received. It is difficult, and perhaps not expedient, to describe them in detail. But they are the choice and especial fruits of the highest order of Christian education, and for this reason they deserve to be recorded by one whose province it is to notice and report whatever is most characteristic in the facts which come under his observation. And what educational fact even approaches in importance to this?

"Let any one examine, even superficially, the aspect of the children whom one sees in the streets and lanes of our large cities—for these are the gross materials upon which mainly the experiment is to be tried—and say whether it can be an easy work to form in *them* the graceful habits of Christian courtesy and refinement. Yet this is constantly done. I remember seeing a child who had been abandoned, in rags and filth, by a vagrant mother, at the door of an institution where to do works of mercy is the daily office of its inmates, and whose appearance and manner were so striking that I was induced to inquire how she came to be there. I had supposed her to be the child of parents whose appreciation of the privileges to be enjoyed in such a school had led them to forget the prejudices of their station. She was only a specimen of what could be made in such hands of the abandoned offspring of a dissolute pauper.

"Another case was that of a girl carried by a wiser mother, almost by force, to a school of a similar class, and left in moody stubbornness to find her own place in it. She was at first so incorrigible a thief that, before the dismissal of the children, her pockets were always examined and emptied of the half-pence, bits of slate pencil, and other unlawful acquisitions, which she had pilfered during school time. This was a necessary part of her daily education. She is now a model to the whole school of all the graces and virtues of her age; and she is by no means the most striking instance within its walls of what can be effected by the skill and wisdom of teachers whose charity no wilfulness can fatigue, and whose patience no labours can exhaust.

"And these are examples, which might be multiplied to any extent, of what can be done to civilize those who have often lost, before coming under the power of such influences, even the *natural* graces of their state. Nor does it affect them only, but their parents and friends, who, seeing the great work done in them, are filled with amazement and confusion, and are evangelized *ex ore infantium*. It is necessary to have witnessed this, and to have witnessed it often, to comprehend *all* that is effected by such teachers; of whom we may surely now say that society profits by their labours, and is interested in their continuance."

RECREATION NECESSARY TO HEALTH.

It is very generally recognised and admitted that deprivation of air and exercise is a great evil; but it is not so well known that abstinence from occasional recreation or amusement is also an evil of no slight magnitude. It is, however, a primary law of the economy that no organ can maintain its integrity without regular recurrent periods of activity and rest. In the case of the muscular system, if any muscle or set of muscles cease to be used, it wastes and disappears; but if it be used too much it becomes strained, and loses its power. It is the same with the nervous system: if the brain be never exercised, its energy is impaired; but if it be over-exercised, its energy is exhausted. If, when a person takes a very long walk, he return home fatigued, and find that his muscles are temporarily thrown into a wrong or disordered condition; and if he continues this process of fatiguing himself every day, after a certain time he becomes thoroughly knocked up, ill, and incapable of undergoing even a common amount of exertion. So it is with the brain. If an individual keep his attention upon the stretch for an undue number of hours, he experiences, at the expiration of his task, brain-fatigue, loss of mental power, and a sensible necessity for rest; and if this individual persevere, day after day, month after month, year after year, in subjecting his brain, without intermission or repose, to extreme fatigue, he will be setting up a peculiar state, which is, unhappily, excessively common in these times, and is known by the name of congestion of the brain. The activity of any organ causes a flow of blood towards itself. If a person raise his arm by the action of the deltoid muscle, that action or contraction of the muscle produces a determination of blood to its interior; and if a person think, the act of thought causes a flow of blood to the brain; but if a person think intently, this flow of blood is often very perceptible, for the head becomes hot, and a sensation of throbbing about the temples, or in the head itself, is experienced. Now, when a man undergoes too much brain-work, a constant and considerable flow of blood to the head occurs, which may become chronic or permanent, and produce that condition which is called determination of blood to the head—a condition which not unfrequently ends in apoplexy or paralysis. Congestion of the brain is one of the most prevailing diseases that torture humanity.—*Journal of Health.*

HINTS ON THE PRESERVATION OF THE HEALTH OF THE TEACHER AND PUPIL.

The increasing experience of medical men, and the elaborate statistics of disease which have from time to time been given to the reading public, all tend to prove that the various classes of society are, from their habits of life and other circumstances attending their different occupations, liable to diseases and disordered states of health peculiar to themselves, and either resulting from, or controlled by, those circumstances. Thus, those who have the charge of youth, whose occupation is sedentary, who are confined for several hours during the day to the desk and the schoolroom, who have their share of anxiety, and who are daily subject to occurrences calculated to "try the temper" and disturb their equanimity, are liable to certain disordered states of health arising from these causes; and there are also various deviations from health to which the schoolboy is subject. Frequently he is taken from "his paternal fields" or his "native hills," with their pure bracing air and enlivening prospects, to exchange his unbounded freedom and his rustic amusements for the comparative restraint of a scholastic establishment, and a regular routine of study and application. It is intended to give a few hints, for the preservation and restoration of the health of those exposed to the influences above menmtioned—not to treat of diseases already existing, but to show the means best calculated to prevent their occurrence, or to check them when in their most simple and initiatory form.

To no man is the possession of the "*mens sana in corpore sano*" of more value than to the teacher, for without the latter the former is of little avail, and often becomes a cause of pain rather than a blessing. So close is the connection and sympathy between the body and the mind, that it is impossible for disordered function to exist for any length of time in the one without seriously affecting the other; and there are certain diseases of the digestive organs, or (as they are commonly called) dyspeptic affections, which, by causing mental depression, drowsiness, inability to fix the attention, and mental irritability, will unfit the strongest-minded man for any occupation requiring the exercise of patience, perseverance, and judgment. But although it is generally admitted that the possession of good health is the greatest of earthly blessings, and that without it learning, honour, success, and everything else for which man toils, are unsatisfactory, and in their enjoyment do not repay the labour of their acquisition; still we too often see its maintenance neglected and trifled with, and made a secondary consideration rather than a primary object. The advice given by Horace Mann to a young friend about to commence his studies for the bar—advice founded upon years of painful experience and regret—should be deeply impressed on the minds of all who have to earn their daily bread, or maintain their position in society, more by the exertion of the brain than the labour of the hands. He says:

> "First, you need health. An earnest student is prone to ruin his health. Hope cheats him with the belief, that if he can study now without cessation he can do so always. Because he does not see the end of strength, he foolishly concludes there is no end. A spendthrift of health is one of the most reprehensible of spendthrifts. I am certain I could have performed twice the labour, both better and with greater ease to myself, had I known as much of the laws of health and life at twenty-one as I now do. In college, I was taught all about the motions of the planets as carefully as though they would have been in danger of getting off their track if I had not known how to trace their orbits; but, about my own organization and the conditions indispensable to

the healthy functions of my own body, I was left in profound ignorance. Nothing could be more preposterous. I ought to have begun at home, and taken the stars when it should come to their turn. The consequence was, I broke down at the beginning of my second college year, and have never had a well day since. Whatever labour I have since been able to do, I have done it all on credit instead of capital—a most ruinous way, either in regard to health or money. For the last twenty-five years, so far as it regards health, I have been put from day to day on my good behaviour, and during the whole of that period, as a Hibernian would say, if I had lived as other folk do for a month I should have died in a fortnight. . . . . . . Health has a great deal to do with what the world calls talent. Take a lawyer's life throughout, and high health is at least equal to fifty per cent. more than brain. Endurance, cheerfulness, wit, eloquence, attain a force and splendour with health, which they never can approach without it. It often happens that the credit awarded to intellect belongs to digestion. Though I do not believe that genius and eupepsy are convertible terms, yet the former can never rise to its loftiest heights unaided by the latter. . . . . . . Again, a wise man, with a great enterprise before him, first looks round for suitable instruments wherewith to execute it, and he thinks it all important to command these instruments before he begins his labour. *Health is an indispensable instrument for the best qualities and highest finish of all work.*"

The maintenance of health is by no means so difficult, nor does it require so much skill as is sometimes imagined. Nature teaches her own laws (even the brute will avoid that which instinct teaches him will be hurtful), and she always warns before she permanently punishes any breach of those observances which are necessary for our well-being. Health is not to be maintained, nor even restored, by the "practice of domestic medicine," or by the administration of the various advertised panaceas with which our daily and weekly journals abound; neither those compounds of gamboge, colocynth, and blue pill, vended by Morrison, Holloway and Co., —nor Du Barry's ground lentil powder, rejoicing in the euphonious title of Revalenta Arabica,—nor even the well-directed prescription of the legitimate practitioner,—will be of service without the strict observance of certain rules and regulations, the performance of which depends entirely upon the patient himself. As we have touched on the subject of "quackery," perhaps it will not be out of place to mention a kind of "quackery" which has often done much harm, and which is frequently practised in large schools and other establishments for the young; we mean that kind of "domestic practice" which—with Graham or Culpepper, on the one hand; and senna, salts, rhubarb, and perhaps such potent medicines as calomel and antimony on the other—looks into "the books" for a local pain or isolated symptom of disease, as though it were consulting a lexicon, and then administers the supposed remedies as freely, and with as little compunction, as though it was merely explaining the simple meaning of some ambiguous word or intricate sentence. Now this is wrong; for supposing the case to be one really requiring medicine, if the "dose" given does no harm it wastes time, and perhaps allows a simple ailment to become actual disease; and besides, when the medical attendant is called in, he finds the symptoms masked by the effects of the drugs which have been taken, and cannot be so decided in his measures as if there had been no previous interference. But to proceed. It is one of the fixed and immutable laws of nature that no one organ or system of organs can be long exercised to the neglect and desuetude of the rest, without eventually leading to morbid changes in the over-exercised or neglected organs, or both. In those who read attentively, think deeply, and study diligently, the brain is the organ constantly employed; but the brain, in addition to the function of thought, has to supply nervous energy to maintain the stomach in its integrity, so that it may have the inclination to receive and the power to digest food. The heart also requires the assistance of the brain to give it power to propel the vital current through the blood vessels, giving off various important secretions during its passage through the secretary organs, supplying and nourishing those parts which have been removed by natural or accidental means, until it is returned through the veins, reaches the lungs, there to be exposed to the vivifying and purifying effect of contact with the air and become fitted for the purposes of life, and is finally passed on to the heart, ready again to pursue the same course. Now, all the various processes of digestion, assimilation and nutrition are dependent upon a due supply of nervous power to the organs by which these processes are carried on; and hence it will be evident, from the brief physiological sketch already given, that to keep the brain constantly employed, and at the same time to supply the lungs with an impure and deficient quantity of air, must lead to derangement in some of the vital functions.

These deviations from health soon become evident; the countenance tells tales; the appetite disappears, or becomes fastidious and squeamish; instead of buoyancy of spirits and energy there is a quiet gravity, and but little inclination for light and healthy amusements; but still the mind does not perceive the enfeebled state of the body, unless from some sudden impulse, or the occurrence of events which recal old associations, there is an effort to display the physical energy which existed before a studious life was commenced. Yet although under these circumstances there is not positive disease, still there is a condition of the system liable to disease. Atmospheric changes, which before were borne with impunity, readily give rise to catarrh and other disorders of the respiratory organs. Any slight impropriety in diet or indulgence at table, which at one time caused but little and transient inconvenience, is now followed by days of uneasiness; such as nausea, loss of appetite, thirst, and headache, showing that there is a deficiency in the "healing power of nature," and teaching the suffering that law of nature which insists that even a man's habits and enjoyments must be in conformity with his occupation and position in life. Why is it that those of studious and sedentary habits exhibit the countenance "sicklied o'er with the pale cast of thought?" Because the brain, as it were, monopolizes the nervous energy, and the heart, deprived of its proper share, does not possess sufficient power to propel the blood into the small vessels on the surface of the body; and because the blood itself, not having been properly purified and oxygenated by contact with pure air when passing through the lungs, is vitiated in quality as well as decreased in quantity; and it is partly from this latter cause that we see the pimpled face and the various forms of skin diseases to which those of sedentary habits are liable.

Why does the appetite for food fail, and why is it that the small quantity taken often remains as a load to the stomach, causing pain, heartburn, acidity, offensive breath, and unpleasant taste in the mouth? Because the stomach does not receive a sufficient supply of nervous influence to manifest the *sensation* of hunger; and because the food taken, instead of being subjected to the process of digestion, which is purely a vital process, and one especially governed and maintained by nervous influence, undergoes the same fermentation and putrefaction as all animal and vegetable substances do when exposed to the effects of moisture and warmth; hence acids are formed, gases are extricated, and irritation is caused by an effete and useless mass.

These facts and physiological explanations are thus plainly given, because, by-and-by, important rules for the maintenance of the health, both of teacher and pupil, and, in fact, of all whose occupations are sedentary, will be deduced from them. To proceed. Not only do the functions of the stomach and the power of the heart suffer, when the brain is the organ chiefly exercised, but likewise the nervous system itself suffers; sometimes as an effect or concomitant of gastric derangement, sometimes as an affection *per se*. There is a state of the nervous system from which those of studious and sedentary habits occasionally suffer, which plainly and painfully shows the effects of intense application and mental exhaustion. It is one which cannot be explained in terms intelligible to those who have never experienced it; and although often made the subject of unkind remarks and unfounded suspicions, still it is, in some cases, an affliction as distressing as any to which the scholar is incident. We mean those sensations which are implied by the expression "How nervous I feel," and which are only known, in their real intensity and suffering, to the debilitated, the anxious, and the studious. Under this state of the nervous system the most trivial circumstance will annoy; a thoughtless word said in the most innocent jest will cause mental pain, an "ant-hill" of difficulty will appear a mountain of opposition. With a will disposed to study and acquire information, the least mental effort requires a forced application, and the simple process required to hear and attend to a question and frame a reply, even if that reply be but a monosyllable, is irksome.

Then, again, there are certain disordered states of the nervous system, or, rather of particular nerves, brought on by close and studious habits, (but in which a disordered state of the digestive organs is an almost constant concomitant), which are evidenced by pain and other disordered states of sensation, or of the nerves supplying the organs of sense. First, and most agonizing of these diseases, stands that nervous affection called "tic doloreux; which, from the frequency with which it attacks those of high intellectual attainments and devotion to study, has been designated "the curse of intellect, and the penalty of application."

The nerves supplying the various organs of the senses may be impaired in their function by a disturbed state of circulation within the head, induced by close and continuous study. In the eye, for instance, vision may be weakened, constituting short sightedness; or perverted, as occurs in those who cannot perceive the distinction of colours; or the impression conveyed to the brain by the optic nerve may be entirely imaginary, to which perversion of function may be referred black spots floating in the air, ocular spectra, and other illusions. In fact, each of the three functions of the brain—namely, sensation, thought, and voluntary motion—may be deranged by constant application and want of exercise and fresh air. In support of this assertion cases might be cited from innumerable authors, both of the past and the present day; but it is not necessary to refer to them, for doubtless many of the readers of this paper have, either in themselves or in others who have come under their notice, had many opportunities of observing the pernicious effect of confinement and close study. The mind requires rest as well as the body. We know that long continued muscular exercise causes fatigue; and that after a certain time no manual task is performed either with satisfaction or comfort. It is the same with mental labour. The ardent student, forgetting everything but the attainment of his ambition, may for a time—thanks to a natural good constitution and the regularity of his previous habits—labour without intermission; but soon sleeplessness, dyspepsia, and a host of nervous ailments, remind him that he has a body to care for as well as a mind to cultivate, and that he must not transgress the laws ordained by nature for his own conservation, without paying the penalty of his commissions and his omissions; his mind becomes less vigorous, his memory less retentive, his perception less acute, his judgment less accurate; he becomes melancholy, irritable, and captious, and a gradual increasing imbecility of mind, and weakness of body compels the total abandonment of all intellectual pursuits: whereas, had he but studied in moderation, allowed himself exercise and relaxation, attended to any deviation from health in the functions of his body, he might have gone on increasing his store of knowledge; for if his progress had been more slow it would have been more free from the interruptions caused by bad health, and consequently more sure. The error of over taxation and continuous mental labour is most common in the meridian of life, when the mental powers appear to be fully developed, and to exist in their full integrity. They demand to be actively employed; the mind seems capable of so much that there appears to be no limit to its capabilities. It is now that genius and a cultivated intellect make their mightiest efforts; they enter the race from which there is no turning back, and in which there is no resting place, with the determination "*aut Cæsar, aut nullus.*" For a time no uneasiness is felt; success, and the pleasure of success, attend every step; the mind, under this stimulus, appears able to master every difficulty and to grasp every undertaking: but the season of mental depression must come, and that which was before all splendour and pleasure now becomes gloom and heaviness. Let the man who is endowed with superior genius, learning, or talent, pause before he abuses and wears out the great and noble gifts with which Providence has blessed him; let him remember that they are given him to use not to abuse; and that it is his duty, both to himself and to his fellow-man, to endeavour to preserve his mental powers in their integrity for many years, not to sacrifice them in a few.

In a paper published in the "English Journal of Education" of August last* teachers and parents were warned of the dangers of youthful precocity. A few more remarks bearing on that subject now become necessary. During childhood and early youth the various vital functions of the body are in an extraordinary degree of activity, for they have many and important offices to perform. The pulse of a child beats nearly twice as many times during a minute as that of a man, and the action of the lungs is in a like increased proportion; consequently a copious supply of pure air is necessary, that the blood when passing through the lungs may be rapidly and perfectly purified and oxygenated, for this is the intention of the accelerated respiration; and therefore, without plenty of pure air, no child can properly increase in stature and strength.

In boyhood, the rapidity of these actions is diminished; in adolescence, still more decreased; and when manhood is attained, and the bones have received their solidity, the muscles become braced and toned, and the processes of assimilation and nutrition become directed to the maintenance, not to the building up and increase, of the body; then the pulse "ticks temperate music," the step is firm, the frame is upright, and all the functions of the body are those of a man. Now it is a remarkable fact, founded upon anatomical and physiological observations, that in infancy and early youth the nervous system is more perfectly and definitely formed than any other parts of the system, from which we may infer that the functions of the nervous system are especially necessary for the healthy growth and maintenance of the body. It has been shown that the desire for food is purely a nervous sensation, and is entirely dependant upon a proper supply of nervous power to the stomach. We all remember how acute the sensation of hunger was in our boyhood, and how unwelcome was the announcement, "dinner put back two hours." In those days we very rarely felt the bad effects of a hearty dinner, as manifested by inactivity and drowsiness, because the stomach had sufficient nervous supply to originate the desire for food, and likewise rapidly to digest and prepare for assimilation the food taken; and, as with the stomach, so with every other organ of the body whose functions were dependant upon a free supply of nervous energy. The action of the heart was soon accelerated, the cheek soon reddened from exercise or emotion, and the senses of taste, hearing, touch, &c. were acute, if not accurate. Another fact may be mentioned; it is, that in healthy infancy two-thirds of the child's existence is passed in sleep; and, even in boyhood and youth, the deprivation of rest and want of a proper period of sleep is hardly borne and acutely felt. During sleep, the nervous system is not called upon for any manifestations beyond those which are directed to assist the various nutritient, assimilative, and secretory functions of the body. The senses are at rest, no objects are presented to excite the imagination, to exercise the mental powers, or to call forth any manifestation of the passions and emotions, and therefore the vital functions receive that which the growth and support of the body requires—an unlimited and uninterrupted supply of nervous energy. Even in the prime of life, sleep, rest, mental quietude, an idle brain, are absolutely necessary for the repair of the body and the restoration of its strength; how much more necessary than must sleep be, when not only the restoration, but the growth of the frame has to be sustained. After a time the body is so far built up, its organs and their functions sufficiently developed, and its integrity so far secured, that the brain can spare some of its nervous energy to be bestowed upon its own culture. The intellectual powers begin to manifest themselves, and, in addition to the functions of sensation and voluntary motion, the brain is sufficiently matured to evolve the faculty of thought, not that the germ and dawning of thought and intellect do not exist from very early days, but that they are in a rude and disconnected state, and not sufficiently defined to be made available, or to be directed to any useful purpose. In the paper before referred to it was shown that there is sufficient of intellect, even in very early infancy, to require the fostering care of a parent to be guarded from hurtful impressions and bad examples, and to be prepared for future culture. What is now meant is a sufficient maturity of brain, which, after the body has acquired a certain amount of healthy development and strength, is in a proper state to receive and appreciate regular and systematic education, and from eight to ten years of age is quite early enough to make the brain share its energies between our animal and our intellectual existence.

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* On the Moral and Intellectual Management of Children.

We never saw a precocious child a healthy one; for although there might not be any evident disease, and his appetite was good, perhaps ravenous, still the shrunken limbs, the soft flabby muscles, the languid movements, and waxy complexion, plainly showed that the function of nutrition and assimilation, which are purely vital functions, were imperfectly performed. The brain monopolised the nervous energy; the body was impoverished. From the facts already stated, and from the remarks made when speaking of the effects of close mental application and confinement upon the adult constitution, it will be evident that the young are liable to suffer when placed in similar circumstances. Fortunately, however, there is in youth, not only a natural resiliency, a readiness quickly to change from the grave to the gay, and to play as well as to work in earnest; but there is likewise an aptitude in the constitution to recover speedily from depressing influences, and to maintain the bodily functions in their integrity under very untoward circumstances, the "*vis medicatrix naturæ*" exists in the plenitude of its power. Children and youths, when afflicted with acute diseases, generally recover rapidly when the complaint once begins to mitigate in its severity, and a short period of convalescence restores them to their accustomed health; whereas the same diseases occuring in the adult, or in the prime of life, are frequently for a long time doubtful as to their termination, and involve a long and tedious recovery. This healthy mental and physical reaction, natural to youth, is an important consideration to those who have the care of their education, for upon it the principle may be founded, that there is no harm in strict and close attention, during the period allotted to study, if there is likewise a sufficient time given for rest and relaxation.

Boys, when first sent to school—especially if they have not been previously subjected to control, or been called upon to exercise their mental powers—generally suffer from some form of gastric derangement. This may be, and in some instances is, partly "home sickness;" but it may likewise be often traced to want of tone in the stomach itself, or to its becoming overloaded. The appetite for food does not at once accommodate itself to their altered circumstances, and the stomach is called upon to do its former amount of labour with a diminished supply of power wherewith to perform it: hence there is frequently nausea and vomiting, which is a healthy effort of nature to get rid of the offending matter; or else there is pain in the abdomen and diarrhœa, showing that some portion of the food has passed downwards in a crude and indigested state. These disordered states of the digestive organs are likewise often due to the cakes, sweetmeats, and other hurtful compounds with which a kind sister or a fond mother furnishes the "school-box." Catarrhal and other affections of the organs of respiration are very common ailments during a boy's first school-year. The tone of his system generally is usually somewhat lowered by the change in his habits: he has less active exercise, is exposed to the effects of the different temperatures of the school-room and the play-ground, perspires freely when joining in the sports of his playmates, and does not get quite as much pure air as he has been accustomed to inhale—all these influences, together with the physical changes resulting from the determination of a portion of his nervous energy to the studies necessary for his education, exercise their effects, and render him more liable to suffer from atmospheric changes. But although these affections are sometimes attended with a considerable degree of fever, and appear sufficiently alarming they generally yield to very simple treatment if noticed in their commencement. The eruptions and skin diseases from which schoolboys suffer may generally be traced to impurities in the blood, arising from the mal-assimilation of food, and the want of sufficient pure air to oxygenate the blood when passing through the lungs, and to inactivity and want of tone in the skin itself, by which its pores become clogged and its function imperfectly performed. Much may be done to prevent the occurrence of these unsightly affections by the observance of precautions to be noticed by-and-by. There is such a thing among schoolboys as "shamming" to be ill; and although this morbid and depraved state of mind may generally be detected, still it is sometimes a great source of annoyance to the teacher. If the teacher will not believe in the existence of the boy's illness, his parents and friends often will; and if a bad state of health should accidentally supervene, the teacher is blamed for unkindness and want of sympathy, without deserving any censure whatever. Besides, a disordered state of the system may be induced by fretfulness, discontent, pining, and ill-temper, and perhaps its first symptoms are manifested just before the boy is seen by his parents. The most prudent plan in these cases is to obtain the opinion of some experienced and conscientious practitioner, and to act upon it. It is true, we "cannot see a pain;" but from an examination of the pulse, the tongue, the state of the secretions, the appetite, and other evident indications, some idea may be gathered as to the general health of the body; and, if, along with these observations, the boy's natural disposition, his liking or repugnance to study, and his general conduct, are taken into consideration, an opinion may usually be formed not very far from the truth. A boy who will practise deceit of this kind is a pest to any scholastic establishment; for not only is he a constant source of anxiety to those to whose charge he is committed, but likewise he sets an example to his companions which they are apt to imitate, especially if they perceive that he receives any special consideration and indulgence. It must be a relief when the parents are sufficiently convinced of his ill health to remove him from school, for a boy who will for days, and perhaps weeks, practise a systematic falsehood, which requires a certain amount of ingenuity and self-denial to make it appear plausible, has a mind so depraved and an intellect so perverted that it is not likely that he will ever reflect any credit upon those who have the care of his education. He never can be treated with confidence, and he is another instance in which the "*suaviter in modo*" must give place to the "*fortiter in re.*"

Thus, then, the causes and circumstances which influence the health, both of teacher and pupil, have been briefly considered. It has been shown that to possess the "*mens sana in corpore sano*" is (as Horace Mann observes) "the instrument" by which all good work and sound education is to be accomplished, and the various functions of the body most likely to be disordered by confinement and mental application have been noticed.

It is now proposed to suggest means by which health may be preserved under these circumstances, so that the body may be maintained in its integrity whilst at the same time the mind is cultivated and stored with knowledge.

W. P.

PAPERS ON PHYSICAL GEOGRAPHY, No. 5.

THE OCEAN—*continued.*

It is gratifying to find, in confirmation of the views adopted in our last paper in reference to the importance of a more minute and extended knowledge of the ocean and its divisions, that the project of a survey of the Gulf-stream has been recently engaging the attention both of our own government and that of the United States. We learn this from the reports of the proceedings at the recent meeting of the British Association for the Advancement of Science, and gather from the same source the fact that some progress towards the accomplishment of such an object has already been made by the officers of the United States navy. It is earnestly to be hoped that the project will, at no distant time, be successfully carried out. Much of what we at present know of the gulf-stream is vague and unsatisfactory, although its limits lie within the most frequented part of the ocean. Why should not this great *river of the ocean*—for such it really is—be surveyed, equally with any of the great rivers of the land; its precise limits fixed; the temperature of its waters marked; their colour, depth, velocity, and organic contents, fully and exactly determined? Facts of the most practical value to the navigator, not less than of the highest interest to science, would thereby be elicited.

Many facts of such a description have, indeed, already been elicited by the aid of the valuable Wind and Current charts of the Atlantic, constructed under the direction of Lieutenant Maury, to whose useful labours we have already referred. These charts consist simply of an accumulation (under their proper headings) of *observed facts*, as recorded in the log-books of the numerous vessels by which this immense ocean is traversed. Lieutenant Maury's first mode of procedure in their construction was to procure from shipowners, retired sea-captains and others, old sea-journals. To copy from each the position of the ship daily, in latitude and longitude; the force and set of the currents; the temperature of the air and water; the prevailing force and direction of the wind three times a day (at intervals, that is, of eight hours); the height of the barometer; the state of the weather; with remarks upon all subjects calculated to be of interest to the practical navigator. These materials were then sorted, as it were, and digested. Each fact was designated by a particular mark or symbol, and then recorded in its proper place upon one or other of six different series of charts.

The first of the series are denominated by Lieutenant Maury "Track Charts." The second series illustrate the regions of the trade-winds, and the contiguous regions of calms and monsoons. The third are designated "Pilot Charts," and have for their particular object to show the points of the compass from which the wind blows, in all parts of the ocean, and for any month of the year. A fourth series constitute "Thermal Charts:" these indicate the temperature of the surface waters of the ocean, wherever it has been observed—particular colours and symbols being used to distinguish the respective months to which the observations refer.

A fifth series of observations are intended to be placed on record in the "Storm and Rain Charts" of the North Atlantic—not yet completed. These will show the total number of observations that have been made for each month, in every space of 5° square, and will thus indicate the number of days in each particular part of the ocean in which either rain, calms, fogs, thunder and lightning, or storms of any description, with the quarter whence they have proceeded, have been observed.

The series termed "Whale Charts" are the sixth and last on the list. These relate to the places of resort of the whale, both the "right"* whale and the sperm whale, at particular portions of the year. This result is obtained by entering upon each space of 5° square the number of days in each month which have been spent (by the vessels whose logs are employed for the purpose) in that particular part of the ocean; the number of days in which whales—and whether sperm or "right" whales—have been seen; and also the periods within which no whales of either kind have been observed within any given space. From the patient and laborious collection of these observations it appears that there are broad belts of the ocean, over which the right whale is unable to pass; that the warm waters of the torrid zone are, in fact, a forbidden ground to this animal. Within a belt of from two to three thousand miles of ocean, the right whale is never seen. Hence it appears that the right whale of the North Atlantic must be of a different species from the similar whale of the southern hemisphere. The right whale of the North Pacific and that of Baffin's Bay are probably of the same species; and, if really so, there is afforded strong confirmation of the existence of free communication between the waters of either ocean, around the northern extremity of the American continent.

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* This expression is by the seamen engaged in the Greenland and similar fisheries, to distinguish the true whale (*balæna mysticetus*), which furnishes the oil and whalebone of commerce, from other animals of the same family—as the sperm whale, the rorqual, &c.

By means of the processes here adverted to, every space embracing five degrees square of the ocean (that is, every space comprised between two successive parallels and meridians drawn at 5° apart) is made to exhibit its own proper history, and to show how this history bears upon the commercial pursuits of man. As may be supposed, there are large spaces of the ocean (even within its frequented limits) which are yet almost unknown, which are rarely crossed by the tracks of navigators, and within which *discoveries*, in the strictest sense of the term, yet remain to be made—discoveries, not of continents, nor probably even of islands of any magnitude, but of the many and various circumstances that constitute the climatology, the natural history, of a particular region. One main object of such works as those of Lieutenant Maury, is to illustrate these lesser-known parts of the ocean. His Track Charts have already been extensively used by the American navy, and have been the means of shortening materially the ordinary length of the voyage between the coasts of the United States and those of South America. The voyage from the Atlantic ports of America to San Francisco, on the Pacific coast, has also been materially reduced in length by these means.

Among the results most interesting to the student of physical geography that have been developed in connection with the construction of these charts, are those that relate to the trade-winds and other movements of the atmosphere, and to the analogous movements in the sea—the oceanic currents. The existence of a monsoon in the eastern part of the equatorial Atlantic, similar to the well-known periodical winds of the Indian Ocean, has been for the first time fully developed. Between the equator and the parallel of 13° N., the normal direction of the trade-winds is counteracted by the powerful influence of the sun (when in north declination) over the heated coasts and interior of the African continent. Along these parts of the African coast a south-westerly monsoon blows for six months of the year, between June and November inclusive. This wind is not confined to the immediate neighbourhood of the coast: it prevails at a distance of more than a thousand miles off the shore, and forms, in fact, a great cuneiform (or wedge-shaped) region of the atmosphere, the base of which rests upon the African mainland, while its apex lies near the western side of the Atlantic Ocean, at a distance of only 10° or 15° from the mouth of the Amazon. This monsoon brings with it the rains that periodically fall upon the shores of Senegambia and Guinea. With the return of the sun to the southern side of the equator, the regular movements of the atmosphere resume their force (as in the analogous case of the Indian

Ocean), and the north-east trade-wind blows for the remaining half of the year.

In a similar manner, upon the American side of the Pacific Ocean, for a considerable distance to sea-ward, the regular north-east trade-wind becomes periodically converted into a south-west monsoon. Both the external and inner limits of the trade-winds fluctuate periodically, from similar causes, and these great belts of the atmosphere form, in fact, *oscillating bands* upon the surface of our planet—harmonizing in their movements with those of the sun, and following the apparent path of that luminary in his course between the tropics.

We have referred to the analogy which subsists between the movements of the atmosphere and those of the adjacent sea. The atmospheric and the oceanic currents are, in fact, due in great measure to similar causes, and are acompanied by similar results, The aerial and the oceanic fluids mutually act and re-act upon one another, imparting to one another their respective temperatures and motions. Hence the equalising influence upon climate which is exerted by the proximity of the ocean, and which is so strikingly evinced in the case of insular and maritime countries, as contrasted with continental regions. Difference of density in the various strata of the sea and the air, alike due to the different degrees in which their respective portions receive the solar heat—combined with the velocities imparted by the earth's motion on its axis—constitutes the main cause of these great movements that prevail both in the ocean and in the atmosphere. Over the vast spaces of ocean, the natural forces act with unimpeded vigour, and it is there that the normal laws of climate can be best studied. Upon the land, the numberless local varieties—of level, surface, soil, and other circumstances—interfere with the operation of the more general laws, and modify their results.

The currents of the ocean, like those of the atmosphere, vary their limits with the seasons, and preserve an oscillating or vibratory motion. The waters of the Gulf-stream extend further to the northward or southward respectively with the presence of the sun to the north or south of the equator, so that the entire body of the stream forms, so to speak, a pendulum, slowly propelled by heat on one side, and drawn back by cold on the other. This vibratory movement, affecting its northern and southern limits, is independent of the comparative velocities of its different portions, which again vary with the seasons. Regarding (says Lieutenant Maury) the head of the Gulf-stream as stationary in the narrow channel of Florida, where it is hemmed in by the land, we may liken the vast breadths into which its after-course spreads to the wavings of an immense pennon, floating gently in a current,—its various convolutions bearing no slight analogy to the movements of a streamer as it floats in the breeze. These movements of the Gulf-stream and other Atlantic currents (in so far as they are known) are indicated on Number 4 of Lieutenant Maury's series of Charts—those denominated Thermal Charts.

Where the Gulf-stream issues from the Strait of Florida, its water is of a dark indigo hue: the waters of the ocean on each side are of a greenish tint, and the line of division between the two may be traced for hundreds of miles. The Gulf-stream flows, in fact, between banks of cold water on either side, and only gradually loses its distinctive character as it spreads out into the broad expanse of the eastern Atlantic. Even there it carries with it the ameliorating influences of the higher temperature that belongs to its waters, and imparts to our own shores (and those of north-western

Europe) a portion of the heat that has been derived from the glowing regions of the south.

It was long since observed by Humboldt, that the equatorial and other currents of the Atlantic, in combination with the Gulf-stream, preserve a continual circuit of movements in the waters of that great ocean. So that a boat, supposed to be brought round the southern extremity of the African continent (from the Indian into the Atlantic Ocean) by the Agulhas current, could it be left to the unimpeded influence of these oceanic streams, might make the entire circuit of the Atlantic, and return—without the aid of oar or sail—to the part of the ocean whence its voyage had commenced. Our present further knowledge of currents makes it more than probable that *each* ocean—and *each* half of the two great oceans (that is, both the northern and southern divisions of the Atlantic and Pacific)—has *its own* circuit of currents, by means of which a perpetual series of movements is preserved amidst its waters. Thus, the waters of the Agulhas current, as is now well known, do not *all* flow round the southern promontory of the African mainland—a portion of the great stream being deflected round by the adjacent sub-marine banks, and returning *in an easterly course* into the southern portion of the Indian Ocean. This *eastwardly* current of the more southern division of the Indian Sea constitutes a returning stream, in compensation for the general *westerly* flow of the equatorial waters of the same ocean. It facilitates the outward voyage between the Cape of Good Hope and our Australian colonies. Off the western coast of the Australian continent (that is, on the eastern side of the Indian Ocean), the current sets to the northward: upon the opposite side of the same ocean—or along the mainland of eastern Africa—there exists a well-known and powerful current to the southward, which bifurcates on approaching the island of Madagascar, and, inclosing it on either side, afterwards re-unites to form the stream that derives its name from the cape and banks of Agulhas.

We thus trace a perfect and continual circuit of the waters of the Indian seas. There are, of course, besides these great oceanic movements, numerous counter currents, as well as many analogous phenomena of a more local character; but we speak of the *general* direction preserved by the waters of this great aqueous division of our globe. The Red Sea, for example, has its own peculiar system of currents and counter currents, as of tides, monsoons, and various phenomena, both of the sea and the air. A constant current sets from the ocean *into* the Red Sea, through the Strait of Bab-el-Mandeb; like the similar current that brings the waters of the Atlantic through the Strait of Gibraltar into the Mediterranean Sea. In each of these cases there appears to exist an under-current which flows *outwardly*, and restores the general condition of equilibrium. The density of this under-current is no doubt increased by the accumulation of saline matter, remaining from the waters of the external ocean that have been continually poured in, after the evaporation of their surface-portions. Were it not for this outward flow of the lower stratum of water, the contents of these and similar inland seas would be continually on the increase, which does not appear to be the case. But the superior gravity of the lower stratum (due to its greater quantity of briny matter) gives it a tendency to distribution over the lower parts of the adjoining ocean's bed, just as the lighter portions of a fluid always tend to spread uniformly over the upper portions of their reservoir. Were the entrance of either of these seas closed, or partially closed, by submarine banks that nearly approached the surface, the operation of this tendency would of course be checked, and their proportion of saline matter be consequently increased. But this is not the case. In the narrowest part of the Strait of Gibraltar the mean depth is nearly a thousand feet, and in the middle of the strait that forms the entrance of the Red Sea no bottom is found with a line of a hundred and twenty fathoms.*

A similar circuit may be traced in the waters of the Southern Atlantic. The equatorial waters of that ocean flow to the westward; near the South American continent the equatorial current divides, and one branch of it sets, in a general southwardly direction, along the coasts of Brazil. In the parallel of the Rio de la Plata, the "Southern connecting current" (as it has been termed) of these seas crosses the ocean *to* the eastward, and thus re-unites its waters with those adjacent to the West African portion of the Agulhas stream. In the northern half of the Atlantic, the Equatorial current, the Gulf-stream, the Arctic current (of Baffin's Bay), and the Guinea current, indicate by their respective courses another great circuit of waters, or, perhaps, rather a *double circuit;* the one embracing the waters of tropical and sub-tropical latitudes, and the other those of the higher parts of the temperate zone and the adjacent arctic waters.

There is reason, again, to suppose that the northern half of the Pacific Ocean possesses within its temperate latitudes an eastwardly current, analogous to the Gulf-stream of the Atlantic, and the origin of which is found in the seas that surround the islands of the Japan group. After traversing the northern portion of this ocean, from the Asiatic towards the American shores, the stream sets to the southward along the coasts of the American mainland, and finally unites its waters with those of the equatorial portions of the Pacific, which (as is uniformly the case, alike in reference to currents of the ocean and the atmosphere) have a westerly direction. The general course of the currents in the South Pacific appears to point to a similar circuit of the waters that compose its basin. Beyond (that is, to the southward of) the southern tropic, the general flow of its waters is to the eastward, or north-eastward, *towards* the western coasts of South America. The cold stream of water brought thence from the high latitudes proximate to the antarctic circle sets to the northward, under the name of the Peruvian current, along the shores of the American continent, and gradually mingles with the equatorial waters of the great ocean. A portion of these equatorial waters afterwards circulates, upon the western side of the same ocean, amidst the seas that lie between New Zealand and the Australian continent.

It would require much fuller investigation than can here be devoted to the subject (or than, indeed, the observations that have as yet been made supply means for) to elucidate adequately the great circuits that are thus found to exist within the oceanic portion of our globe's superficial covering, and to explain the lesser movements, and various counter-currents, that belong to each. But the great principles by which they are regulated may be considered as fixed, and they are easily expressed. Within the tropics, the general flow of the waters is *from east to west*—that is, in a *westerly* direction. Within the temperate zones, the direction is reversed: the waters flow *from west to east,* or in an *easterly* course.

The same thing is the case in reference to the currents of the aerial ocean—the atmosphere. The equatorial currents of the sea are analogous to the trade-winds of the intra-tropical regions, and the eastward-going currents of the temperate zones resemble the prevailing westerly winds that are characteristic of the same latitudes. The general direction is, in each case, identically the same. Again, the periodical change of direction which distinguishes the movements of some parts of the sea, in the neighbourhood of the land (as on the shores of north-eastern Africa, the Arabian and Indian peninsulas, the western coasts of Mexico, and elsewhere) furnishes a parallel to the monsoons, or alternating winds, of similar regions.

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* A paper on the currents of the Indian seas was read by Dr. Buist at the recent meeting of the British Association. Similar papers on the currents of the other great oceans were read, both by Dr. Scoresby and by Mr. Findlay.

One great principle which is developed through the whole of these movements (as well as through so many other of the infinitely-varied phenomena of the natural world) is that of *change*—unceasing change; or rather, the existence of a succession of changes, which yet, by a principle of compensation that is equally a law of nature, result in the preservation of an equilibrium in the general distribution of natural forces. Not merely do the waters of the sea preserve the succession of movements that have here been referred to, but, by another and equally important series of changes, they circulate through the land, the streams that fertilise the soil deriving *from* the ocean—by means of evaporation, and the consequent agency of the rain-cloud, the falling shower, and the springs that unlock the unfailing reservoirs of the inner earth—the waters which they afterwards return to its bed. In all of these movements the atmosphere plays an important part. Change is perpetual, yet nature—as a whole—is constantly the same, and successive generations of mankind are left in the enjoyment of the bounties with which Providence has endowed the external world. "The wind goeth towards the south, and turneth about unto the north; it whirleth about continually, and the wind returneth again according to his circuits. All the rivers run into the sea, yet the sea is not full; unto the place from whence the rivers come, thither they return again." W. H.

ENGLISH EDUCATION FOR THE MIDDLE CLASSES.

It has long been felt and acknowledged that the education of what may be termed the lower division of the middle classes in this country has been to a great extent grievously neglected, and very generally allowed to pass into incompetent hands. The evils arising from this neglect have of late years assumed a more serious form, in consequence of the instruction now almost gratuitously provided for the poor having so much improved as to be in many cases far better and more complete than that of a large proportion of the children of those by whom so many of the poor are employed. Unless, therefore, timely measures be taken for the improvement of the education of the middle classes, the result will be, that masters and employers will find themselves inferior in knowledge and intelligence to their servants and dependants, and thus the foundation will be laid for an inversion of the orders of society.

At a period like the present, when the teaching and training of the young is so generally regarded as one of the most important of national concerns, this deficiency in the education of the middle classes has not been overlooked. Various plans have been suggested, and some attempts made to provide a remedy. One method proposed, and which has now for some time been partially in operation, is to establish schools, where the boys are boarded at a very moderate cost, under the superintendence of the clergy and others capable of judging of the education given, of the qualifications of the teachers, and of the progress of the pupils, and above all, to provide that the schools shall be entrusted to persons devoted to their work, fully conscious of its nature and importance, and not influenced by mere motives of gain. At the recent opening of a large collegiate institution, established with a view of carrying out this method, a discourse * was delivered by the present Bishop of St. David's, in which, with his usual ability, he has pointed out the end, the means, and the principles with a reference to which those who conduct such institutions should proceed. We believe that we shall be doing good service to the work of educating the middle classes by laying before our readers the substance of his remarks upon this subject, and especially upon the principles on which it should be conducted.

When speaking of the comparative importance of the education of the different classes of society, the Bishop shows very clearly the necessity of extending our care beyond the children of the poor. He admits that it would be difficult to overrate the importance of elevating the moral and spiritual condition of that class which is the basis of the whole social edifice; but then he adds, that it would be neither right nor safe that public attention should be so concentrated on this object as to overlook the claims of those classes which stand higher in the social scale, or to assume that for them there is no need of any like exertions. "It is," he says, "the especial glory of our own institutions, that they place no impassable barrier between the different degrees of men; that they open a broad road, which passes by every cottage door, for honest industry and honourable ambition to make their way, from the lowest rank to the very front of the throne. But still, parity of rights does not imply equality of powers or capacities, of natural or accidental advantages. And common sense forbids that we should lavish our care on those who are least able to profit by it, while we withhold it from those by whom it would be most largely repaid. The class which is compelled, from an early age to the close of life, to devote the greater part of every day to the toilsome earning of its daily bread, may be endowed with no scantier portion of the common heritage of humanity than that which is exempt from this necessity. But it is manifest that those who are subject to such a pressure must as a body remain behind those who enjoy larger opportunities of cultivating and exercising their natural endowments. Every one who has had anything to do with the education of the poor has had painful experience of this fact. And it brings us to the conclusion, that the class so providentially privileged is that which affords the true measure of the national intelligence, which exhibits the genuine stamp of the national character, and is the legitimate organ of the national mind and will; and consequently, that on the intellectual and moral condition of this class must mainly depend the degree in which our people is fitted to fill the place and to execute the work appointed for it among the nations of the earth."

Hence the end to be aimed at in the education of the middle classes is to enable them to avail themselves of the opportunities and privileges of their position, and to fit them by proper culture for filling the place and for doing the work which God has appointed for them. The place assigned to us as

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* "A Sermon preached at Hurstpierpoint Church, on June 21, 1853, on occasion of the opening of St. John's School." By Connop Thirlwall, D.D., Bishop of St. David's. (London: Rivingtons.)

a nation, of whose mind and will these classes may be regarded as the legitimate organ, is, to use the Bishop's words, "in some respects the foremost among the families of the earth: the most conspicuous, the most envied, the most exposed to danger, the most difficult to maintain: the foremost in wealth, in power, in extent of influence, in opportunities of action, whether for good or evil. And when we look back at the small beginnings of this amazing greatness, when we note how minute a speck on the face of the globe is occupied by the imperial seat of this vast dominion, we can hardly help feeling, what nothing but a foolish pride would lead us to forget, that our place has been fixed by the counsels of Divine Providence, in immediate connexion with the very highest of his purposes in his dealings with mankind. For, as the place, so is the work manifestly entrusted to us; the greatest and noblest with which people was ever charged—to be the pioneers of God's way through the desert regions of the earth; to be the carriers of his truth, and of all the social blessings which spring from it, to the rudest and most degraded tribes of our race. It is the office claimed long ago for England by one of the greatest of her sons, *to teach the nations how to live,* but enlarged far beyond any bounds which it was possible for his experience, or even his imagination, to trace."

The end of education being to fit our people for filling such a place as this among the nations of the earth, the Bishop next notices the means that should be used for the accomplishment of this great object. He considers that the means hitherto employed have been very inadequate; that the work of education for the middle classes has, on the whole, been long grossly neglected; that there has been a deplorable waste of the time and resources dedicated to it, or available for it; and that it has been allowed, in numberless cases, to fall into incompetent hands, and has been degraded into a mere instrument of sordid gain. Hence the importance of taking it out of such hands, and of committing it to those who will conduct it in a spirit of devoted zeal, befitting its weightiness and sanctity, and not in a mechanical routine, but with a clear apprehension of its nature and its objects. Thus it is thought possible at once to raise the average standard of education, and to bring it within the reach of a larger part of the community. It is believed that private endeavours, supported by the voluntary aid of those whose hearts are stirred by the undertaking, will suffice to put such a plan fairly in operation; and it is confidently hoped, that as soon as it has begun to be partially carried into effect, it will work its own way, and propagate itself by the simple attraction of its influence and the example of its success. In this way only it can be reasonably either expected or desired that such an undertaking should advance and establish itself. It must recommend itself to general acceptance by its own efficiency, and by the benefits which mark its progress, or it will soon pass into the number of well-meant, but unsuccessful experiments. The class for which it is designed is such as to afford good reason to trust that the hope in which this plan is conceived will not be disappointed. Hitherto it has not commonly been from want of due anxiety for their children's welfare, nor because they are blind to the value of education, that they have been satisfied with the poorest makeshift offered to them in its name, but only because nothing better has been placed within their reach. When they are convinced that it rests with themselves to obtain for their children a training which will fit them for all the relations of life, and enable them to make the best use of the talents with which they have been gifted, and of the opportunities which Providence may put in their way, we need not doubt that they will eagerly avail themselves of so great a privilege, and will not readily take up with anything short of it.

The success of the proposed plan depends, therefore, on its intrinsic merit; and hence the importance of considering the principles which should guide its course, and on which it should be carried on. It is designed for the education of English youth in the middle of the nineteenth century. It is the fashioning of English minds and hearts to fit them for such work as belongs to English men. "Those who are to come under its training are heirs," says the Bishop, "to as rich a patrimony as people ever handed down to its posterity. They number some of the most illustrious of earthly names among their ancestors. They claim a share, by virtue of their birthright, in a countless store of spiritual wealth, amassed by the patient thought, and hard struggles, and persevering labour, and generous sacrifices of many generations, deposited in their national laws and institutions, in their language and literature, in the opinions, feelings, and habits of society. The history of their native land, the lesson of the nations, enriches them with an inexhaustible treasure of heart-stirring recollections and heroic examples."

Hence, in order to prepare those who have been so signally favoured for entering on this noble inheritance, to qualify them for the exercise of their privileges, and to render them worthy of the name they bear, it should be the grand object of their education to teach them to prize the good which has fallen to their lot, to feel the vantage-ground on which they stand, and to cherish the ties which bind them to the past; to train them to love and venerate the wise and good of former generations, and, drawing the chief nourishment of their own spirits from the same sources as they, to grow up in communion of thought, and feeling, and principle with them.

But whilst every sound system of English education must be thus rooted in the past, and can only thrive as long as this connection is preserved, it may not so exaggerate the claims of the past as to withhold what is due to the present and the future. "For how," asks the Bishop, "can we consistently profess to look back with veneration and love to the past, while we deny our sympathy and regard to that which has sprung from its loins? How can we view it with an intelligent admiration if we believe that it has been barren of all wholesome and abiding fruits? We should, therefore, desire that the rising generation should go forth to their allotted tasks, not only with all the aids of knowledge suited to the times in which they live and to their place in society, but also with a due sense of their advantages; not boasting that they are better than their fathers, but feeling, with humility and thankfulness, that they have been in many things more highly favoured, more richly endowed; that they have a broader field open to their endeavours, larger rewards to stimulate their industry, more abundant helps to smooth their way; though it may be, also, with peculiar trials, snares, and difficulties besetting it."

Although it may not be easy to decide between the competing claims of different branches of mental culture, or to light upon the right mean between a course of study which concentrates the faculties within too narrow a circle, and one which disperses them among too great a multiplicity of objects, yet the Bishop considers these not to be points of the gravest moment in the present case, and that on those which are most material the nature of the institution will suffice to guide to a safe conclusion. "A system of education adapted to the genius of our people must," he says, "be sound, solid, and practical. It will strive to do its work thoroughly. It will not rest in any outward show, but will try to go below the surface, and to reach to the core and essence of the thing it has to deal with. It will set less value on the amount or kind of knowledge it imparts than on the exercise of the intellectual faculties, and the degree in which they are trained for the business of life. But neither will it be satisfied with the furnishing of means and the preparation of instruments, but will aim at taking possession of the central seat of government, and of the powers by which the instruments are to be wielded, and the means employed for the purposes of the agent. That is to say, it will bestow its chief care on that habitual direction of the affections and the will which constitutes the character, and which determines the real worth and usefulness of the man. In other words, it will regard religion—not religious knowledge, or the employment of the memory and the understanding, or the imagination, upon religious subjects, but religion in its application to the heart and the conscience—as its great concern, that to which all others are to be kept constantly subordinate."

In religion, no doubt, it is true that, so far as regards the history and fundamental doctrines of our faith, all reference to national distinctions must be dropped. But in another point of view, there is no subject in which we have more need to remember our national traditions, attributes, and privileges, and to stand on our guard against what is foreign, no less to the broad lines of the English character than to the first principles of Christian truth. "We have now," says the Bishop, "special occasion to bear in mind, on the one hand, that our reformed religion was planted by the wisdom of a gracious Providence in our land, as in a congenial soil, where it would strike deep root, and send forth mighty branches, and yield fruit abundantly for the nourishment and the healing of the nations; that it satisfied both the earnest searchings of the English mind, and the instinctive cravings of the English spirit, and so intertwined itself with the fibres of the English heart. And on the other hand, we are bound thankfully to acknowledge, that it is to this best of God's gifts we owe not only our national greatness, but our social happiness; the noblest passages of our history, and the richest blessings of our homes. And therefore, we have reason to believe, that on the faithfulness with which we preserve this sacred deposit unimpaired, on the stedfastness with which we guard it against open aggression and insidious encroachments, in the care and diligence with which we hand it down to the next generation—on this depend our prospects, not merely of power and glory, but of well-being, honour, and safety for the time to come." The Bishop expresses his belief, that in the plan of the institution, at the opening of which his sermon was preached, the best warrant is afforded that this great object will be kept steadily in view. For the work will be carried on by those who have been already dedicated to a ministry which comprehends the maintenance and transmission of pure religion among its most essential functions, and who are bound by the most solemn vows "to draw all their cares and studies this way."

Such are the general principles on which Bishop Thirlwall considers that education for the middle classes should be conducted in this country. It should be adapted to the genius of our people, and therefore should be sound, solid, and practical, striving to do its work thoroughly. It should be essentially English, fitting English minds and hearts for such work as belongs to English men. It should cause them to feel the vantage-ground on which they stand, to love and venerate the wise and good of former generations, and to grow up in communion of thought, and feeling, and principle, with them; to draw their chief intellectual and religious nourishment from the same sources, and faithfully to preserve the sacred deposit of religion unimpaired. The application of these principles to the actual business of education opens a yet wider subject, to the more detailed consideration of parts of which we shall probably often have occasion to return.

ON RENDERING OUR NATIONAL SCHOOLS INDUSTRIAL.

When the National Society, four or five years after its formation, petitioned for its charter, one of the statements in the petition was, that since its foundation it had laboured to carry into effect the design of its founders by educating the children of the poor, without any exception, in the doctrine and discipline of the Church of England, and in reading, writing, and cyphering; and, whenever it was practicable, *in works of industry*. Hence it has been very fairly inferred in a recent publication*—of the contents of which we shall avail ourselves in this paper—that to make it *always* practicable to educate in such works, is so far from being inconsistent with the original design of the National Society, that it is rather to carry that design into effect more entirely and completely. Hitherto the inculcation of sound religious and moral principles has formed the basis of all the teaching in our National Schools. And upon the whole we have reason to be satisfied with the result of the inquiries recently made as to the soundness of the principles actually inculcated, and their conformity with the doctrine and discipline of the Church of England.

But to inculcate sound principles is not all that is required. These principles must be applied and be made the moving-spring of action. Nor must we be surprised or discouraged if we find reason to believe that under the head of application of principles there still remains room for, we may perhaps say, almost unlimited improvement. Such is the opinion of the Rev. Mr. Moseley, one of the school-inspectors, who professes to take a more favourable view of religious instruction in our schools than most of his colleagues in that office. He says that there are some elements in which religious instruction in our schools appears to him to be deficient. For instance, he has found in it nothing to represent those admonitions which a religious parent is accustomed to address to his children, with a personal application to the conscience of each, and an individual knowledge of its necessities; and which, appealing to the heart and affections, have an influence with children greater than that which they yield to reason or authority. It is, moreover, his opinion, that, in the *exclusive* direction to religious objects which the teaching in some schools receives, the exercise of that discretion is wanting by which a pious and judicious parent would provide in respect to the education of his own children, that due care should be taken to encourage a veneration for the Scriptures, and to impress them with a due sense of their importance; and that, of all subjects in which they are instructed, religion should be made the least burdensome to them.

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* "Industrial Schools the best Means for decreasing Juvenile Crime: A Plea for their General Adoption. By one of the Editors of 'The Finchley Manuals,'" Pp. 142. (London: Masters, 1853.)

Now, one great obstacle to this personal application to the conscience and to an individual knowledge of its necessities is, that the child does not fully develop itself in the school-room. This is far more plainly to be seen in the play-ground, or at meal-times, or when the child is engaged in some active out-of-doors employment. "The value of that moral influence which might by a judicious master be exercised over the boys when associated with them during their hours of labour, and at their meals, will, I am sure," says Mr. Moseley, "be appreciated by every practical educationist. It is during these hours that the real characters of the children become known; and at such times that the springs of action amongst them may be influenced and controlled, and the public opinion of the school brought over to the side of the schoolmaster." And another inspector, Mr. Symons, is of opinion "that efficient moral training can be best accomplished where industrial labour out of school is combined with religious and secular instruction in school; and he believes that horticulture and farm-work are by far the best adapted for the purpose. If it were only, therefore, as a means of promoting the application to actual life of the religious and moral principles inculcated in our National Schools, it would be a great improvement to render them industrial.

But if we refer to the end of education, which is, in respect of the working as well as of the other classes, to fit our people for filling the place and doing the work which God has appointed for them, we see at once that the education of the children of the poor should be not only moral and religious, but industrial; and that a regular training in good habits necessarily includes industrial occupations, and the giving a taste and aptitude for useful employment. The capacity for action is determined by the cultivation of habits appropriate to the duties of the station which the child must occupy. And among the labouring class, no habit is more essential to virtuous conduct than that of steady and persevering labour. In elementary schools for them, the instruction should therefore be so conducted as to assist the labourer both in acquiring mechanical dexterity and also in bringing his intelligence to aid the labour of his hands. Now at present this cannot be said to be done in our National Schools. The children's days are passed in alternate lessons and play; and, as far as the school is concerned, a boy thus brought up is entirely unfitted for agricultural or any other labour. He can neither dig, hoe, nor plough; is puzzled with a harness, or afraid of a horse. Of a child so trained, hard or continuous labour would exhaust the body and weary the mind. Such is the actual condition of most of the children in our Union Schools; and it would be also of our National School children, if it were not for their daily connexion with their homes, and for the occasional employment which they thus obtain, and for the opportunities thus afforded them of having some practical training in works of industry from their parents.

The great objection in the minds of the poor to sending their children to school is, that while at school, it is felt that, whatever the child learns, he learns nothing calculated to enable him to get his living. Hence they do not value the schooling the children get, because it does nothing towards enabling their children to get their livelihoods. Nay, they sometimes express a fear, and not always without grounds, that if they remain at school it may prove injurious to their future prospects. "The cottage of an honest labourer," says one of the inspectors, " however bad a school in other respects, has this advantage, that it is a good place for the industrial training of his children; he knows the importance to them of being brought up to labour. I have myself known," he adds, " parents capable of making sacrifices that their children may go to school, and willing to do so, if they thought it for their welfare—yet object so to do after the children were of an age to work, lest, as they said, ' the children should not take kindly to labour.' " Obviously the remedy for this would be to add to religious and moral teaching and to the more usual duties of a school, that most essential branch of knowledge, the practice of industry. Although it would not be possible for boys to learn all the various work to be done in farms, so as to become perfect labourers, nor for girls all the various occupations in the house, so as to become perfect servants; yet both boys and girls might learn the elements of profitable industry in their respective departments, and thus become apt, instead of inapt, for industrial pursuits. This would render their schooling valuable in the eyes of their parents, and make them more eager to send their children to school, and to make sacrifices, if necessary, to keep them there.

This would also have a tendency to remove another defect in the present system of education, namely, that, with all the pretensions made to the contrary, it is essentially superficial. This no doubt arises in a great measure from the children being removed from school, because they are not taught to work, before it is possible that the seed sown can produce any good fruits. If the children were trained in works of industry, they would in most cases be permitted to remain longer at school, and then, instead of superficial instruction, they would be imbued with religious principles, and trained to moral as well as industrial habits. And thus the prejudices now raised against all instruction by the superficial nature of that actually given would cease. For, as it has been justly observed by one of the inspectors, "immoralities, insubordination, conceit, disinclination to hard labour and to continuous industry, though they are not *necessary* results of superficial instruction, are promoted by it. Practical experience, in country districts, teaches the farmer to prefer the labourer or servant who cannot write, simply because he finds that those who can oftener wrong him than those who cannot. From this frequent fact he draws a wrong conclusion. He mistakes reading and writing for education, and attributes evils to its existence which are owing to its absence. It is difficult to convince him that it is not teaching reading and writing which does the mischief, but teaching nothing else. Reading and writing and arithmetic, to an educated mind, are as limbs to the body or sails to the ship, but they can effect, if given alone, nothing for good conduct. They are mechanical, not moral elements. They can no more make a good man than a crucible can make a chemist, or a plough a ploughman."

There is much truth in these remarks; and there is no doubt that much might be done towards preventing such superficial teaching, and the evils and prejudices of which it is the occasion, by adopting a system of industrial training, and also by endeavouring in the usual course of reading and other teaching to apply the learning of the school to the arts of life and to every-day knowledge. Where at first it might be difficult, or perhaps scarcely possible, to introduce at once actual practice in works of industry, much that would be most useful for working-class boys and girls to know might be taught them as a part of the ordinary school instruction. Thus, the times of sowing and planting; the modes of managing animals, and their habits; the culture of the ground; the different kinds of soil; the manures that suit them; the different kinds of timber trees, and the properties and uses of their woods; and many other particulars of a similar nature, are all subjects of this description. And, to use the words of one of the inspectors when enumerating such subjects, "Every teacher who is ignorant of these things should set to work to learn them: then every walk he takes in the field with his scholars, as well as every lesson they read, will be the means of instruction to them on all such subjects." Children are very much alive to this kind of instruction, and are very fond of bringing to the test of experience what they have been taught. And by doing so at home and in their way to and from school, they will commence at an early period habits of observation on things around them, which, in after life, may add much to their happiness, and open sources of enjoyment to which they have hitherto been strangers. If to such teaching and observation practical instruction could be added, and the child be trained to apply what it learns and to have a hand in the work so as to realize it, it is obvious that it would be a great benefit and furtherance to its progress in all kinds of labour and employment in after life.

We had intended to conclude these observations (for which we are mainly indebted to the "Plea for Industrial Schools," already referred to) with some extracts from the account given in it of the successful manner in which instruction in works of industry has been introduced into the National Schools at Finchley, but our limits compel us to defer doing so until another number.

UNIVERSITY EDUCATION—THE CLASSICS.

THE intrinsic importance of this subject, or the present dearth of topics of great public interest, occasions its frequent discussion by the daily press. The *Times* not only devotes articles specially to the question, but turns aside from alien matters to allude to it; and, as Cato ever urged that Carthage must be destroyed, so the *Times* repeats, in season and out of season, that Oxford must be reformed. We printed in our last number an article from the *Morning Chronicle* in the same strain. That journal deserves, at least, the praise of showing disinterested zeal in the cause it advocates; since its own columns usually exhibit, with small variety, that complexion of thought which is characteristic of minds formed under the present University system; and an ill-natured critic might remark, that a tolerably strong argument against so much Latin and Greek in education could be derived from the pages of the *Chronicle* itself. We do not wonder that Mr. Cobden has formed so low an estimate of the training which produces such results. A man of his original mind and vigorous power of expression cannot be expected to care much for clever adaptation of the thoughts of Latin writers and skilful application of their language.

Those who desire sound reforms will not have been encouraged by the shallow and partial treatment of educational discussions which we find in the journals of widest circulation. There is great need of sober and honest dealing on both parts, if the administrators and the assailants of the present system are ever to be brought to agreement. As Mr. Cobden represents the opinions and wishes of a large and influential party, and as his views will probably gain strength with time, it may be worth while to consider his much-quoted assertion, that one number of the *Times* contained more valuable knowledge than the entire History of Thucydides.

We much fear that Mr. Cobden's estimate of the comparative money value of the two sorts of knowledge will be found correct, and that his usual commercial sagacity has not here been wanting. It seems that he knows the market only too well. At home we have still a large, but probably not a growing demand for the article of classical instruction. In Australia every person is far too busy to consider whether it is wanted or not. A time must come, however, when the gold-digger will pause in his absorbing toil, and bethink him that the soul of man requires for its satisfaction, and his infant empire for its stability, something more than wealth; and unless Mr. Cobden be very active to guide him better, our rich antipodean may then fall into the grievous error of endeavouring to secure for his sons what old-fashioned people at home call a good education. Now, however, learning has no chance there. In remote corners of the United States still lingers a spark of reverence for that knowledge which the fathers of New England, who laid the deep foundations of the Republic, made one of their earliest cares. This, we must admit, is not much to trust to; and in that broad land there is some demand for all things good and bad. The most outrageous fashions and the vilest wines of Europe, if carried far enough, find sale at last; just as the wildest forms of fanaticism find a home and followers, at least in the remote West. And so, we must not be deceived if we find here and there some slight regard for antiquity. The mass of Americans are of Mr. Cobden's mind. On neither side of the Atlantic is Greek learning a paying investment; and to know the price current of Manchester goods is far more to the purpose. To be familiar with Thucydides is not in itself a hopeful road to riches, and might possibly raise some slight scruples as to certain by-ways commonly adopted. We must admit that, on the principles of Mr. Cobden's school, neither historians, nor orators, nor poets, ancient or modern, are of the least use; nor is any art or study which merely pretends to refine and elevate the mind of man, and does not help him in "developing the industrial resources of his country." It were vain to argue with the disciples of this school. Their choice is made. The good and evil fruits of exclusive devotion to purely utilitarian objects we may already to some extent appreciate; but it must be left to time and to the experience of younger states than ours to decide the question. Those, however, who think that knowledge is good in and for itself, and irrespective of the material wealth it can procure, may be willing to consider what are the uses, if any, of studying the classics, and how the expected benefit may be most speedily and surely reached.

It is strange, and to a man of Mr. Cobden's character and career must be incomprehensible, to witness the devotion of many capable intellects to a pursuit which, if tried by the test of Mr. Cobden's school, must be admitted to be of no practical utility. It is not difficult to show that the knowledge of the classical languages is necessary to the full comprehension of many of our native writers, whose minds have, sooner or later, yielded to this influence. Some of our most popular living authors appear in their maturer works to labour under a sort of passion for displaying their knowledge or ignorance of Greek and Latin. The latest writings of Sir E. B. Lytton, produced in the fulness of his experience and reputation, are a signal example of this weakness; and it is worth notice that the same books show a much healthier moral tone and tendency than his earlier productions: as if the study of antiquity had occasioned or accompanied an improvement in this respect. In the face of the clamour now raised against this very study, we must hold this to be a surprising proof of the power it exercises over any mind that falls under its sway. Mr. Cobden no doubt would say that we are slaves, and children of slaves; and that the sons delight to wear the yoke which their fathers framed. We read the classics to understand our predecessors' imitations of them, and so we fall to imitating ourselves. Some of the most beautiful and finished writings of Tennyson are essentially Greek, not only in thought, but in expression; and it is not possible adequately to appreciate them unless familiar with the Greek, and especially the Homeric poems. Here we see a writer who has the nicest observation of nature, and commands the happiest illustrations from the circumstances of modern life, preferring to use sentiments and language which few of his countrymen, comparatively, can understand.

It is almost superfluous to observe that Milton is as thoroughly Latin as Tennyson is, sometimes, Greek; and that many passages of Paradise Lost are as difficult as Virgil himself. Mr. Cobden will of course meet us were by asking of what use is the faculty of fully comprehending Milton or Tennyson; and we must answer, that to him and his followers it is of no use at all. He is far past any profit from such sources.

If our supposed regard for the example of the ancients were more genuine and life-like, and not so much a mere tradition from our own ancestors, we should imitate them in making our own native classics a subject of systematic study for our youth. Homer was a school-book at Athens in the time of Thucydides; and so were Virgil and Horace at Rome in the time of Tacitus. Horace himself anticipates such a destiny for his writings; though he supposes them to serve a much humbler purpose in instruction than he could have really wished or expected. It is quite as necessary to explain Shakspeare as Sophocles, if readers generally are to understand their author. It would be possible to frame a system upon which an English play should be as carefully and minutely studied as a Greek play; and whether we think our own or the ancient dramatists the richer store of thought, it is certain that the former would be far more readily accessible. Those who desire to understand and to be able to translate with any justice the Greek and Latin poets, are driven to seek the corresponding ideas and expressions in the poets of their native tongue; and thus the study of the ancients leads to that of the moderns: but if the latter study be a good thing, it should be followed independently and as a leading object. The fact is, however, that we have a moderately good system of instructing in Latin and Greek, which appears to be chiefly a fortunate accident, corrected, in some degree, by the experience of centuries: but for teaching English we have no system that any one pretends to call good, and our experience of its working is almost all to come.

We want both the genius to create and the faith to adopt a new method of instruction; and, with our national disposition to adhere to precedents, we might as soon expect to see the inauguration of a new scheme of polity. At present, it is likely that the clearest notions of grammar are possessed by those who have acquired them in Latin and Greek; and we are not prepared with any direct method to substitute for the circuitous route we have been used to take. It does not seem possible, therefore, to resist the conclusion, that those who desire a mastery of their own language must, at least for the present, submit to seek it by a path as long and difficult as heretofore. Still, when we observe how much importance is ascribed in our day to saving time in everything, we shall feel the need there is of trying to supply what all must admit to be a defect. Surely it is not an invariable law that all the invention of the age shall be lavished on material things; and we may hope that the knowledge of their mother-tongue may be brought within the reach of those who devote earnest, though not very prolonged efforts to its cultivation.

The readers of this journal may be expected to remember that

> "The fruit which soon falls from the tree
> Is seldom good for much, we know;"

and it is not very necessary to warn them against that popular impatience, so unwisely fostered by the most powerful journals, which requires every kind of progress to go on at railroad speed. Great and rapid success over obstacles hitherto or usually invincible, is likely to generate unreasoning self-confidence, both in nations and individuals. It is to be expected, too, that those who have shared in bringing about the triumphs of our age over inanimate nature, should be loudest in denying the difficulty of attaining any other result they may think desirable. If no province of physics is impervious to their arms, why should the moral world, they will ask, offer more resistance? Further, it is quite natural that the daily press should catch the tone of feeling of those who are necessarily influential people, and should seek popularity by forcibly expressing the opinions such people may, with more or less distinctness, hold. In spite of such clamour, we must maintain that real and solid education, whether its basis be ancient or modern, will be always, under ordinary conditions, a slow and difficult operation; and those who assert that "a practical power of reading and enjoying the ancients may be more easily acquired than at present," will certainly occasion disappointment wherever they raise hopes of any extensive improvement in this respect.

Notices of Books.

BACON'S PROFICIENCE AND ADVANCEMENT OF LEARNING, DIVINE AND HUMAN. Pp. 211.

BACON'S ESSAYS, WITH A TABLE OF THE COLOURS OF GOOD AND EVIL. REVISED, WITH REFERENCES AND NOTES BY THOMAS MARKBY, M.A. Pp. 150. (London: *John W. Parker.*)

THESE cheap and carefully-edited reprints more especially claim our notice on account of the professed object of their publication. In his preface to the "*Advancement of Learning,*" dated 1852, the editor stated it to be sent forth in pursuance of a plan (begun about a year before by the reprint of the first book of Hooker) of issuing, at intervals, in a cheap form, some of the chief works of our great English writers. The need of something of the kind is inferred by him from the general neglect of our own tongue, still prevalent in our schools. In English schools, so called because not devoted to the study of the classics, the disregard of the best models of writing in our own language is a very serious evil, for it practically amounts, as he truly observes, to omitting to direct the attention of the learner to the study of any good authors at all, except perhaps a few scraps in books of miscellaneous extracts. In the preface to the "Essays," (which the editor mentions that the publishers have been encouraged to reprint on the same plan as the "Advancement" by the ready sale of the latter,) he expresses his fear that there is no reason for thinking that the "Advancement" has been introduced into the class of schools for the benefit of which the edition was more particularly intended. We trust that the reprint of the "Essays" may in this respect prove more successful. We think that they are better suited to the proposed purpose of the editor. Parts of the "Advancement" might be selected which contain admirable reflections, as in the latter part of the second book; but as a whole the scheme proposed in it seems too comprehensive and difficult to be made intelligible to the boys of an English school. There are also many passages in Latin occurring in it, of which the editor should have furnished translations, if he designed the book to be chiefly used in English schools. The "Essays," on the contrary, have many advantages, and have been particularly recommended by Hallam in his "Introduction to the Literature of Europe," for educational purposes. "Few books," he says, "are more quoted; and, what is not always the case with such books, we may add, that few are more generally read. In this respect they lead the van of our prose literature; for no gentleman is ashamed of owning that he has not read the Elizabethan writers; but it would be somewhat derogatory to a man of the slightest claim to polite letters, were he unacquainted with the Essays of Bacon. It is indeed little worth while to read this or any other book for reputation sake: but very few in our language so well repay the pains, or afford more nourishment to the thoughts. They might be judiciously introduced, with a small number more, into a sound method of education,—one that should make widom, rather than mere knowledge, its object, and might become a text-book of examination in our schools."

HEADS OF AN ANALYSIS OF THE HISTORY OF GREECE. BY DAWSON TURNER, M.A.

THIS little work is a kind of skeleton outline of Grecian history. The principal events are recorded in separate headings, and appended to each are extracts from the standard writers on the subject, including Grote, Heeren, Bulwer, and others of equal celebrity. For instance, in its proper chronological place occurs the mention of "The Rebuilding and Fortification of Athens, by Themistocles." Then follows an extract from Bulwer's "Rise and Fall of Athens," on the peculiarity of the character of Themistocles. On the occurrence of the name of Homer, quotations are given from Ihne, and the Encyclopædia Metropolitana, on the various theories existing with respect to the Homeric poems, &c. Socrates, again, introduces a passage from the "Quarterly Review." This will give an idea of the nature of this work; it is, of course, insufficient as a book to learn Greek History from, but very useful in the way of refreshing the mind by a rapid review of the various occurrences, with the main effects produced by them.

THE PHILOCTETES OF SOPHOCLES. EDITED BY T. K. ARNOLD, M.A.
THE MEDEA OF EURIPIDES. EDITED BY T. K. ARNOLD, M.A. (London: *Rivingtons.*)

THE first of the above books contains the Philoctetes of Sophocles, with notes from the German of F. W. Schneidewin, translated by the Rev. R. Paul, and edited by the late Mr. Arnold. These notes are tolerably good, and are unusually explanatory of the scope and bearing of the different portions of the drama, and the bye-play, so to term it. There is an introduction prefixed, with some useful information on the story of Philoctetes, with a sort of analysis of the plot, and explanatory outline of the argument. In the edition of the Medea, the notes are those of Witzschel's German edition. The author is rather inclined to fall into the fault of prolixity; but his annotations are careful and accurate.

THE LAST SHILLING; OR, THE SELFISH CHILD. A STORY FOUNDED ON FACT. BY THE REV. P. B. POWER, M.A. (London: *Haselden*, 1853.)

THE design of the author of this little work is to show the evils arising from that too common vice, of selfishness. It is written in a pleasing style, and cannot fail to interest children. It is a fit book for a school library, and may be the means of repressing in some degree this almost universally inherent failing.

THE PRINCIPLES OF FRENCH GRAMMAR, WITH NUMEROUS EXERCISES FOR THE USE OF SCHOOLS AND PRIVATE STUDENTS. BY J. CARON. (Edinburgh: *Oliver and Boyd;* London: *Simpkin and Co.*, 1853.)

BOOK OF FRENCH VERBS; OR, THE ACCIDENCE OF THE REGULAR AND IRREGULAR FRENCH VERBS, IN ALL THEIR DIFFERENT FORMS, THROUGH ALL THEIR MOODS, AND ALL THEIR SIMPLE AND COMPOUND TENSES. BY A. F. GENTILI. (Dublin: *Hodges and Co.*, 1853.)

LEÇONS FRANCAISES DE LITTERATURE ET DE MORALE; EN PROSE ET EN VERS; OU, NOUVEAU RECUEIL DE MORCEAUX EXTRAITS DES MEILLEURS AUTEURS. (London: *Relfe and Co.*)

THE compiler of the first of these works puts it forth as a clear exponent of the principles of French grammar, and in the customary belief that it contains something superior to its predecessors. In this case, the special heads under which to seek for improvement are the article, pronoun, and verb. We fully admit that these parts of speech appear in an intelligible and complete form; but there is nothing so new or so good in it as to justify the addition of another grammar to the number already published. On the contrary, there is such a similarity to some other French grammars, that when we took up the book we believed it to be a modified edition of Delille; but every teacher of French, like many teachers of English, must write his own text-book. Though uncalled for, the book is not useless; it bears indications of having been written by a teacher of experience.

The Book of French Verbs consists of a most ample conjugation of the regular and auxiliary verbs, "through all their moods, simple and compound tenses, not only affirmatively, but negatively, interrogatively, and both negatively and interrogatively, with a fulness that would occupy too much space in ordinary grammars." The work here described occupies upwards of 130 pages of the book, the remaining 70 being devoted with much more conciseness to the irregular verbs. The former part may be defined as an elaboration of such exercises as those given to pupils to write out in their hours of private study, and the object appears to be to supersede such exercises. How far and with what pupils the use of such a book becomes advantageous will be determined by the teacher. We should imagine that its greatest use would be as a text-book for somewhat advanced pupils of that anomalous class that acts as a drag upon the favourites. But when we observe the minute and varied translation of the French, we are inclined to think the author intends it for the hands of the veriest tyro.

Thus stands the verb *punir* in its negatively interrogative form, "*Ne punis-je pas?* punish I not? do I not punish? *or,* am I not punishing?" The latter portion of the book appears far more valuable and much less diffuse. In it "an attempt has been made to systematize the irregular verbs, and to refer them to their respective conjugations, supplying a model of every class of such verbs, and arranging all those of similar forms under their respective models." The anomalies are thus shown to be guided and restrained by general principles, and verbs that are generally treated as distinct exceptions are shown to follow rules more or less general.

The last of the above books consists purely of reading-lessons in French, selected from various writers. It has somewhat the form of the English reading-books used in the higher classes of our schools. Among the pieces are found some of the best passages from Fenelon, Pascal, Bossuet, Barthelemy, and others; attached to pieces of the present and the last century are the names of Segur, Miguet, Bazin, Jouy, and Dumas. Care has been taken to make the selections such that no exception could be taken to them by the most scrupulously anxious parent or teacher. The book may be recommended to those who have acquired a good knowledge of the language, and are prosecuting the study of French with a view to becoming acquainted with its intricacies and composition. Genuine models will be found in *Leçons Françaises.*

REPORT OF THE CHURCH OF ENGLAND SUNDAY-SCHOOL INSTITUTE, FOR THE YEAR 1853. (London: *Sunday School Institute,* Fleet Street.)

THE HISTORY OF THE SUNDAY-SCHOOL UNION. BY W. H. WATSON, SENIOR SECRETARY. (London: *Sunday School Union,* Paternoster Row.)

It is upwards of seventy years since Mr. Raikes made his first exertions in establishing Sunday-schools. Very little progress was made, however, till after the commencement of the present century. In 1818 we find 5463 schools, with 477,225 scholars. In 1833 there were 16,828 schools, with 1,548,890 scholars. According to the census of 1851, the schools have risen in number to 23,498, and the scholars to 2,407,409, and some of the supporters of the voluntary scheme of education and gratuitous Sunday teaching affirm that at present there is one in every six of the whole population of England and Wales attending Sunday-schools. It must not, however, by any means be supposed that, although the returns of 1851 come with all the weight of official authority, there is anything like two and a half millions in attendance at Sunday-schools, much less the higher number stated in some quarters. Many circumstances concur to produce pardonably high returns, especially in Sunday-schools. It is not, therefore, remarkable that the second of these works should, after giving a long and detailed history of the rise and progress of Sunday voluntary teaching, deplore the irregularity of attendance; or that the former should present such marked concern in the same matter. Sunday-schools are a most important part of the present machinery for raising the moral tone in the education of the poor; and the system of employing voluntary teachers affords a power calculated to produce the most beneficial results. But they should be considered supplementary only to the day-school, and the teachers as acting in conjunction with those of the day-school. The latter lay the foundation and supply the tools, while the former rear the super-

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ecomes more readable after the
ittee of the Union took a very active
s Bill. The "History of the Sunday-
ith more interest by those friends who are
sant with its details than by the general reader

ool Institute" is the usual Annual Report of that
m is to promote efficient religious teaching in Sunday-
cted with the Church of England. In addition to the Report,
a striking and appropriate sermon by the Rev. V. W. Ryan; an
on "The Importance of Simplicity in Ideas and in Language in the
Work of Teaching," by the Rev. W. W. Champneys; one by the Rev. R. Bickersteth, on "The Divinity of the Bible;" and a third, on "The Influence of Sunday-Schools upon the different Classes of Society," by the Rev. W. Cadman.

PATON AND RITCHIE'S SCHOOL REGISTERS:
I. GENERAL REGISTER.
II. DAILY CLASS REGISTER.
III. REGISTER OF FEES.
IV. PROGRESSIVE SEWING REGISTER.
V. SABBATH-SCHOOL TEACHER'S ROLL-BOOK. (London: *Paton & Ritchie*, 1853.

THESE are very full and convenient registers. The only apparent omission in the series is that of a book in which to post the general results of the Daily Class Registers—a School Ledger. No. I. is a book in which the pupil's name, age, date of admission, and residence are placed on his entry. There are other columns for less important, but, often very necessary references, and one to receive the date at which he leaves, and the cause of leaving. No. II. is the register in which the class teacher enters his pupil's names and addresses, and records their attendance and school payments. No. III. is the general cashier's register, and is so ruled that the total of each scholar's payments may be seen at a glance, whether for a week, a month, three months, or a year. No. IV. is adapted to Girls' Schools only, and affords means for registering the progress of the girl through all the various grades of acquisition, from Hemming to Fancy Work. No. V. is a register in which can be entered the name, age, and residence of each Sunday Scholar, leaving space for general remarks, and notification of attendance for six months.

HOUSEHOLD CHEMISTRY; OR, RUDIMENTS OF THE SCIENCE APPLIED TO EVERY-DAY LIFE. BY ALBERT J. BERNAYS, F.C.S. NEW EDITION. (London: *Low & Son.*)

A FAMILIAR introduction to chemistry, intended especially for schools and young people. It is written in a plain and easy style, and is well adapted for the purpose. Appended to each chapter are questions for examination. It is divided into eight chapters, treating on the chemistry of the atmosphere; chemistry of the breakfast-table, of fermentation, of the dinner-table, of glass, china, and of soap, of household metals. To these is added an Appendix of "Suggestions for Experiments," from which we extract the following:—

EXPERIMENTS REQUIRING NO APPARATUS BEYOND WHAT IS TO BE FOUND IN EVERY HOUSEHOLD.

"1. Take a fresh candle and light it. Mark the carbonization or apparent blackening of the wick, the melting of the tallow, its rise into the wick, the form of the flame, and the division of the wick into the part which consumes away and that which is simply soaked in tallow.

"2. Move the candle quickly through the air, and note carefully the results, as regards smell, smoke, &c. Hold a dry plate immediately over the flame—carbon is deposited;—some distance above it—the plate is not soiled.

"3. Try at what distance immediately above the flame it ceases to light or even char a piece of paper.—Repeat the experiment with a lighted camphine or oil-lamp, and find out why the paper will inflame at a much greater distance from the flame than a candle not surrounded by a lamp-glass.

"4. Put a handkerchief or cloth round the *bottom* of the lamp-glass, so as to exclude the air from the lighted lamp,—it will be extinguished. Relight the lamp, close it at top instead of at bottom, and mark the extinguishing of the flame.—Take the lamp-glass, hold it over the lighted candle, and prevent the access of air from below by means of a cloth.—Admit the air below, and close the opening with a card. In all these experiments the light is put out.

"5. Take a wax-end rather less than one inch in height, or an end of a taper; kindle it, and place it on a plain deal table; cover it up with the chimney-glass, and if any air should come in between the glass and the table (which may be known by the continuance in the burning of the candle) surround it at bottom with a rag.—Admit air at bottom by slightly lifting the glass, and then kindle the light again. Vary the experiment by closing the glass at top instead of at bottom. In both cases the light will be extinguished.—Put a card lengthways into the upper part of the lamp-glass, so as to divide the opening, and let it stand upon the table over a lighted taper. It will continue to burn, because a current is produced; fresh air rushes down on one side into the glass upon the flame which it feeds, while the foul air escapes upwards on the other side of the card. And this may be proved by the following experiment: A candle that has been burning until a long wick has been obtained, is blown out. If the red-hot wick be held on one side of the opening, formed by the card and the half circle of the chimney-glass, the vapour will be visibly drawn down; if held on the other side, the vapour will be blown into the outer air. A candle will not burn more than two or three seconds under a tumbler. Why? Because the oxygen of the air in the tumbler is consumed in the process of combustion, and flame cannot exist in its absence.

"6. Hold a wine glass a little distance above the light; in a moment it will become covered with dew in the inside. Why? Because water is always formed when a candle or lamp burns in air. It is deposited as dew upon the glass, because the latter abstracts so much heat, that the air is no longer able to hold all the water in invisible solution. And this will be proved by a continuation of the experiment; for if you hold the glass till it becomes warm, dew is no longer deposited. The heat communicated to the air by the flame is sufficient to prevent the watery vapour arising from the combustion of the hydrogen of the tallow, oil, or gas, with the oxygen of the air, from becoming visible.

"7. Remark the fact that a candle gutters in a draught, or when the wick is too long, and think of the reason. Also that some candles require snuffing. Examine the wire round the wick of one of Palmer's decimal candles.

"8. To see the effect of draught (or increase of air) upon fire, use the bellows. Let a newspaper hang down to the first bar of the grate, so as to cover in every visible part of the chimney. Think why the fire burns brighter. When you see much smoke escaping from the hot coals, poke the fire, and ask yourself why the smoke disappears, or rather is no longer formed ?

"9. Light a thin piece of wood, and mark the effects of admission or exclusion of air. Make up a small heap of firewood in the garden, as I have described at page 48, and study the formation of charcoal.

"10. Take a spoonful of brandy, *and after having corked the bottle*, set fire to the spirit contained in the spoon. Mark the feebleness of the light, and think over the causes of the brilliancy of flame.

"11. Bring an externally dry decanter filled with cold water from the well into a warm room. Breathe on a penknife, and ask yourself in both cases where the water, that bedews the decanter and the knife, comes from. You *see* your breath in winter, and on cold days in spring—why not on warm summer days ? Having proved the presence of water in the air by the decanter experiment, think about dew, and try to increase your knowledge about it. Take a thermometer into the fields of a warm summer's night, when the sun is setting. Mark the lowering of the temperature among the grass, and the consequent fall of dew. Feel the leaves of trees. Pluck off a handful, lay them for half-an-hour on the gravel walk, then quickly heap them up round your thermometer, and mark its fall.

"12. Your knife rusts in moist air, but not in warm dry air. Verdigris, so called, forms on copper saucepans left in moist air. Why ? Think on the processes of oxydation.

"13. Take some milk, warm it in a cup, and add a few drops of vinegar. Throw it upon a filter of linen, and regard the curd. Shake some cream in a small medicine bottle until the butter separates.

"14. Take some flour, make it into paste with water, and wash it in a fine muslin or linen cloth in a stream of water. Examine the gluten which remains, and the starch which makes the water milky.

"15. Put an egg, or egg-shells, into a basin, and pour vinegar upon them. Place the basin on the hob, and watch the results (an egg-shell consists of carbonate of lime or chalk. The vinegar will dissolve the lime of the carbonate of lime; carbonic acid will escape with effervescence, and you will obtain a solution of acetate of lime).

"16. Put a pinch of whitening (carbonate of lime), into a champagne glass, pour some vinegar upon it; and plunge a wax-end, fastened to a piece of wire, into the glass. Ask yourself why it is extinguished.

"17. Throw a piece of iron into the fire. It will not melt. If you have a ladle, melt some lead in it. Try which melts most easily, a piece of white window-glass or a leaden bullet. Think about the melting points of various metals, and in making the above experiments, remember it is as satisfactory to melt a small bullet, as a piece of the size of a cannon ball.

"18. Dissolve a few grains of hard soap in clean rain-water, and add a few drops of this solution to hard water. You will find the soap curdle. The lime of the water forms, with the fatty acids of the soap, a greasy insoluble lime-soap, while the soda of the hard soap combines with the sulphuric acid with which the lime of the hard water is usually associated. Until, therefore, the lime is thrown down from the hard water, the soap will not begin to act as a cleansing agent.

"There are other experiments which will suggest themselves to the young student, and which therefore need not be enumerated."

ANSWERS TO THE MATHEMATICAL QUESTIONS.

QUES. 187.—*Proposed by Mr. Thomas Ambler.*

Two vessels, A and B, contain each a mixture of wine and water; in A the wine : water :: 1 : 4, and in B the wine : water :: 3 : 7. How much must be taken from each vessel so as to have a mixture of 7 gallons of wine and 20 of water ?

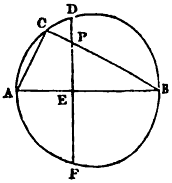
Answered by Mr. J. Godward, Mr. E. Rutter, A. M., and Truesley.

Let x = gallons taken from A, of which $\frac{1}{5} x$ is wine; then $27 - x$ = gallons taken from B, of which $\frac{3}{10}(27 - x)$ is wine. Therefore $\frac{1}{5} x + \frac{3}{10}(27 - x) = 7$, and this gives $x = 11$, and $27 - x = 16$.

QUES. 188.—*Proposed by N' Importe.*

If from a point in either side of a right-angled triangle, a perpendicular be drawn to the hypothenuse; show that the rectangle of the segments of the hypothenuse is equal to the rectangle of the segments of the side, together with the square of the said perpendicular.

Answered by Mr. J. Godward, and Mr. W. H. Levy.



Let A B C be a triangle, right-angled at C, and circumscribed by the circle A D F; and through P, any point in B C, draw D E F perpendicular to A B. Then $AE \,.\, EB = DE^2 = DP \,.\, PF + PE^2 = BP \,.\, PC + PE^2$.

Second Solution, by Mr. S. Dyer, E', Mr. C. Mansford, and Mr. E. Rutter.

Let A C B be a right-angled triangle and P E perpendicular to A B; then by similar triangles $BP : BE :: BA : BC$; hence $BA \,.\, BE = BC \,.\, BP$, or by Euc. II. 3, $AE \,.\, EB + BE^2 = BP \,.\, PC + BP^2$; wherefore $AE \,.\, EB = BP \,.\, PC + BP^2 - BE^2 = BP \,.\, PC + PE^2$.

Cor. When P coincides with C, we have $AE \,.\, EB = CE^2$, a well-known property.

QUES. 189.—*Proposed by Mr. John Thompson.*

If A^1, B^1, C^1, be the angles which the sides of the triangle subtend at the centre of the inscribed circle, then will

$$4 \sin A^1 . \sin B^1 . \sin C^1 . = \sin A + \sin B + \sin C.$$

Answered by Mr. W. Godward, jun., Mr. W. H. Levy, E'., and A. M.

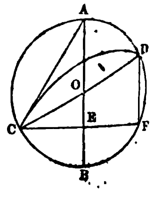
$\text{Sin } A^1 = \sin \frac{1}{2}(B + C) = \cos \frac{1}{2} A$; similarly $\sin B^1 = \cos \frac{1}{2} B$, and $\sin C^1 = \cos \frac{1}{2} C$.

$$\begin{aligned} \therefore\ 4 \sin A^1 . \sin B^1 . \sin C^1 &= 4 \cos \tfrac{1}{2} A . \cos \tfrac{1}{2} B . \cos \tfrac{1}{2} C \\ &= 2 \sin \tfrac{1}{2}(B + C) \left\{\cos \tfrac{1}{2}(B + C) + \cos \tfrac{1}{2}(B - C)\right\} \\ &= \sin (B + C) + \sin B + \sin C \\ &= \sin A + \sin B + \sin C \end{aligned}$$

QUES. 190.—*From Earnshaw's Dynamics.*

A B is the vertical diameter of a circle. A perfectly elastic ball descends down the chord A C, and being reflected by the plane B C, describes its path as a projectile; show that the ball will strike the circle at the opposite extremity of the diameter C D.

Answered by Amicus, and on similar principles by E'., Mr. W. Godward, jun., and A. M.



Draw C E F perpendicular to A B, and let r = radius C O, $\theta = \angle CAO$, v = velocity of the ball acquired down A C, and R = range on C D; then $\angle OCE = \frac{\pi}{2} - 2\theta$, $AC = 2r \cos \theta$, and $v^2 = 2 AC . g \cos \theta = 4 r g \cos {}^2\theta$. Because A C is perpendicular to B C the ball will be reflected in the direction of A C, and therefore A C will be a tangent to the projectile. Hence, taking C as the origin of rectangular co-ordinates, and C F as the axis of x, the equation of the projectile is

$$y = x \cot \theta - \frac{g x^2}{2 v^2 \sin^2 \theta}$$

$$= x \cot \theta - \frac{x^2}{2 r \sin^2 \theta} \quad . \quad . \quad . \quad . \quad . \quad (1)$$

also the equation of the diameter C D is $y = x \cot 2\theta$ . . . . . (2)
Hence for the intersection of (1) and (2), we have

$$\cot \theta - \frac{x}{2 r \sin^2 \theta} = \cot 2\theta$$

$$\therefore x = 2 r \sin^2 \theta (\cot \theta - \cot 2\theta) = 2 r \sin \theta = \text{C F},$$

and since C E D is a right angle, R = C D.

LIST OF MATHEMATICAL ANSWERS.

Amicus, ans. 189, 190; Thomas Ambler, Wakefield, ans. 187; Samuel Dyer, Leeds, ans. 187, 188; E′, Great Stukeley, ans. 187, 188, 189, 190; John Godward, Chelsea, ans. 187, 188, 189; William Godward, jun., Nautical Almanac Office, ans. 187, 188, 189, 190; W. H. Levy, Shalbourne, ans. 187, 188, 189, 190; Charles Mansford, Westminster, ans. 183, 189; A. M., ans. 187, 188, 189, 190; N'Importe, ans. 188; E. Rutter, Sunderland, ans. 187, 188, 189, 190; John Thompson, London, ans. 189; and Truesley, ans. 187, 188.

NEW QUESTIONS,

To be answered in our Number for November, 1853.

Ques. 191.—*Proposed by Amicus.*

$$\left.\begin{aligned} \text{Given } x + \frac{x^2}{y} + y &= 19 \\ \text{and } x^2 + \frac{x^4}{y^2} + y^2 &= 133 \end{aligned}\right\} \text{to find } x \text{ and } y.$$

Ques. 192.—*From the Senate House Problems for* 1843.

If $y = e^{\frac{1}{1-\log x}}$, and $z = e^{\frac{1}{1-\log y}}$, prove that $x = e^{\frac{1}{1-\log z}}$

Ques. 193.—*Proposed by Mr. Wm. Godward.*

Let A B C be a triangle right-angled at C, such that A B = 2 B C, and let a point D be taken in A B, such that B C + B D = A C; then if D E be drawn at right angles to A B meeting A C in E, it is required to prove that B D = D E.

Ques. 194.—*Proposed by Mr. W. H. Levy.*

From a given paraboloid, whose axis is a, the greatest cylinder is cut out, and from the remaining upper part, the greatest cylinder is also cut out, &c. *ad infinitum*. It is required to prove that the distance of the centre of gravity of the remaining solid from the centre of the base of the paraboloid is $= \frac{2}{7} a$.

⁂ It is particularly requested that all mathematical contributions be forwarded, at *latest*, by the 20th of each month.

METTRAY.

The following account of this institution for the reformation of criminals is extracted from Mr. Hoskins's recent book:—

"Mettray, established by the Viscomte Bretagnères de Courteilles and the Conseiller Demetz, is situated in a rich and well-wooded country, and is a pleasant and cheerful-looking place, without the least appearance of a prison or penitentiary; no guards, soldiers, or policemen—no locks or bars, or even inclosures, to prevent escape. A pretty church is the most conspicuous building, as it ought to be; for without religion prisons may be reformed, but not the prisoners. On each side of the little chapel, but separated from it, are two large buildings, containing the schoolroom, hospitals, residences of directors, kitchens, and other offices; opposite the church is a large quadrangular court, which is used for the play-ground. In the centre of it is a basin, and at each angle a well, where the boys wash themselves. On two of the sides of this court are rows of five detached, plain, but neat houses, with projecting roofs. They are all of the same size and form, and are erected at an expense of 300*l.* each, many by private individuals, whose names are inscribed on the front of them, and others by different towns in the neighbourhood. Each house accommodates a family of forty lads, with a master and assistants, and consists of three large rooms; the ground floor is only used as a workshop, the first and second floors often as play-rooms in wet weather, and there also the boys have their meals; after supper their hammocks are let down, and each lad sleeps in his own bed, their heads being alternately in a different direction, to prevent their talking at night. The master of the family and his assistant sleep in alcoves commanding a view of each room. There are now five hundred and sixty boys in this establishment, who have entered at different ages from five to thirteen, very few, however, under seven, but about half the number from that age to twelve, and none are allowed to remain beyond twenty. They have all been before the tribunals, or, as the French say, acquitted '*comme ayant agis sans discernement;*' that is to say, with so much of guilt attaching to them as to authorize the magistrates detaining them, under the sixty-sixth article of the criminal code, whenever there was any prospect of their benefiting by such detention, or probability of a continuance of vicious habits if they restored them to their companions, or homes and parents, when possessed of any.

"One hundred and ten of these five hundred and sixty boys are wooden shoemakers, joiners, farriers, locksmiths, ropemakers, leather shoemakers, blacksmiths, tailors, masons, cartwrights, gardeners, and servants attached to the sisters of charity, who attend the hospitals and preside in the kitchens; and others who, in their turns, week after week, are engaged in the services, the boys performing every kind of labour required. The remainder, about four hundred and fifty, are agriculturists, and work on fifty hectares, or one hundred and twenty-three acres of land, belonging to the establishment, and one hundred and fifty hectares more, which they farm. The land is fortunately good, and affords encouragement to the young workmen, who, instead of acquiring a fondness for labour, might become disgusted, if their toil was thrown away on an ungrateful soil.

"They have, also, detached farms managed by families or colonies from the institution; and, as a reward, the best lads have this confidence reposed in them.

"The boys are decently and simply clothed, not as criminals, but all in the same kind of blouse and costume, which would be easily recognised, if they endeavoured to escape. They are taught, however, to consider it a disgrace to make such an attempt, when there are no guards or bolts to prevent them. Although most of the lads are taken from central prisons and houses of correction, where there is little discipline, and in many a vicious and corrupting but attractive liberty, it is only on their first entrance that any of them asked to be restored to their former prisons, where they had fewer punishments; and scarcely any have endeavoured to escape, and those only at the commencement of their residence here, when, of course, regular labour and strict discipline would be irksome to them.

"A few days' confinement in the solitary cells subdues the obstinacy of the most vicious, and soon they take to their work, and become contented and happy. They are well fed—they have meat three times a week, and on other days soup; vegetables, and half a pound of good bread, three times a day.

"The directors, when they founded Mettray, selected twenty-three young men of respectable farmers' families in the neighbourhood, and educated them for the important task of masters. This normal school is still continued as part of the establishment, and out of the numerous scholars they select the best for their officers. They have thus a constant supply of well-trained, clever teachers, whose principles and character they are well acquainted with; and the connection with their neighbours has in many ways an advantageous effect.

"Notwithstanding this expense, and the boys seldom staying beyond three or four years—leaving, indeed, when their labour is most profitable—the Government allowance of sevenpence a day for each child is sufficient, with what they earn, to cover all the expenses of the establishment.

"Each family elects, every month, two from their number, who are called *frères ainés*, to assist the masters; and so judiciously do they use this privilege, that it is very rarely that the directors exercise their power of revoking their election.

"Everything is managed with military regularity. A trumpet rouses them in the morning; and after dressing, quickly arranging their hammocks, saying their morning prayers, and washing at the fountains, at the sound of the second trumpet they assemble for their work; quickly and silently they obey the call, as those who are not silent, and the one who arrives the last, are marked with a bad ticket. They march to and from their work with military precision, to the sound of the trumpet, which prevents their acquiring the sluggish and indolent gait too often a characteristic of country labourers.

"At this season of the year they work from half-past five to eight o'clock, when they have half an hour for breakfast and recreation, and then work again until one o'clock, when they have an hour for dinner and play; from two to four o'clock, when in this climate every peasant reposes, they attend a class in the schoolroom, where they are taught, for ten hours in the week, reading, writing, and accounts; for two hours more their religious duties; the same time is given to teach them singing, and, as a reward for good conduct, the instruments of the brass band, which are not only a treat, but often an advantage to the boys in their future career, as soldiers, or enabling them to increase their weekly gains as labourers, by assisting in the music of the parish churches.

"The lads are taught sitting, so that their bodies repose while their minds are occupied; and thus refreshed, they are enabled to return with vigour to their work at four, and continue until eight o'clock, when they go to supper; and after their prayers and evening hymn, they have a few minutes' recreation, while their hammocks are preparing for bed-time, nine o'clock.

"In the winter they work from two to about six, in the fields, and have two hours' class in the evening; and when the weather is bad, they break stones under the awnings between the houses.

"During the time allowed for play, they talk and do as they like; but their masters and *frères ainés* take care that they do not make use of gross language, swear, quarrel, or fight. I can testify that there is no restraint; for I saw them during the time of recreation, and I never heard more hearty peals of laughter on any playground. There was mirth, innocence, and happiness in the sound; and it prepossessed me more in favour of the institution than anything the intelligent master who went round with me said. Their hours of amusement are, however, turned to account: gymnastics strengthen their bodies; they are also taught to work water engines, and frequently they have rendered great services in extinguishing fires in their neighbourhood.

"Religious instruction is carefully given them every Sunday morning after mass, by their chaplain, and in the afternoon by one of their directors; as it is only by such instruction that they can be sensible of the errors of their previous ways. After religion, emulation is the great principle by which reform is effected. Taking places is practised in the school. Their work is often given to them by the piece, and those who have behaved well are allowed to go to the detached colonies, or are employed in the gardens, or such services of the establishment which are liked best by the boys. Occasionally they have examinations of the different workshops, and small pecuniary rewards given, which are kept for those who attain them until they leave the establishment. Emulation between families is also encouraged, rewarding those who have had no punishments during the week; and so useful is this *esprit de famille*, that some have been known to oblige their members to restore books which they had received for their good conduct when no longer deserving of them, and other families have required the expulsion of incorrigible boys, who disgraced them by their bad conduct. The greatest incitement to good behaviour is, however, the inscription on the tablet of honour. Three months' good conduct, without bad tickets, entitle them to this privilege. Very many have been inscribed on it four or five times, some more frequently, and others during the whole time of their detention. Those who behave themselves well for two years receive a ring of merit, and their names are written on the tablet.

"There are slight punishments for trivial offences; such as not allowing the offenders to join their companions during play-hours, detaining them solitarily in the parlour to afford them the opportunity of reflecting on their conduct, and giving them at their meals nothing but dry black bread and water. The severe punishments are a degradation ii a *frère ainé*, or erasure for those whose names are inscribed on the tablet of honour, and solitary confinement in lighted or dark cells. In the former they are employed in making the heads of nails; and during the time they are allowed to leave their cells every day, they have to break stones.

"The solitary cells are ingeniously arranged behind the chief altar of the chapel, so that when the curtain is drawn, and the doors opened, they can hear and join the service, and lessons are in that manner read to all of them at the same time. They say that the solitary confinement is much dreaded by the boys, but there was not a single cell occupied when I was there. The severest punishment, but which has only been enforced two or three times, is expulsion from the establishment, sending them back to the central prisons and houses of correction from whence they came.

"What, then, is the result of this institution? The influence of religious exercises and instruction, and the example of reformed and older boys; the regular habits enforced by strict discipline; the sight, perhaps, of rich crops and green fields, the work of their own hands; the love of labour thus judiciously instilled into their minds; the cultivation of honourable principles by a prudent emulation; enrolment and erasure from the tables of honour and good conduct; and more especially the division of the establishment into small families, when the masters become, as it were, fathers of the families, and naturally take more interest in the boys, and understand their characters better, than if they all lived together in one room—have had an effect exceeding the most sanguine expectations. That success has been acknowledged by the Government, and similar institutions are now formed and forming in various districts in France.

"The establishment of Mettray has only been founded ten years; and notwithstanding the revolutions which have unsettled all the institutions of France, its prosperity continues to increase. Of six hundred boys who have left, only thirty have fallen into their previous vicious career. About one hundred and thirty have entered into the army and navy. When their time of detention here expires, there is no difficulty in finding employment for all. The farmers of the neighbourhood show rather an eagerness than otherwise to get workmen from Mettray; and they may do so in perfect safety, as their character for years is written on the tables. The highest on the list on the class of work, are of course the best workmen, and if the same names are found on the table of honour for good behaviour, they have the best guarantee for their future good conduct.

"Of one thousand and forty boys who had entered the establishment up to January 1st, 1849, five hundred and ninety-seven could not read; and of these, five hundred and sixty have learnt reading, and nearly as many writing and accounts. They leave, then, the institution with some education, with a knowledge of farming, gardening, or a trade, and some of them with a little knowledge of music, with their minds reformed by the habits and discipline I have described, and the constitutions of many restored after an infancy of misery and vice."

ASILE AGRICOLE.

I recently visited at Cernay (an insignificant place between Colmar and Mulhouse) an institution called an *Asile Agricole*. It differs from that of Mettray and others, in receiving, not condemned, but only destitute children, and such as have shown evil and depraved propensities. In 1847, a few benevolent gentlemen of the neighbourhood, finding pauperism on the increase, and some sort of asylum very much needed for the reception of orphans, and the children of the poor allowed to contract habits of idleness and mendicity, determined to make an attempt to open a place of this kind. A society was formed, and a suitable foundation fund raised; a house and a piece of waste land were hired, whither each member was entitled, on payment of 100 francs per annum, to send an orphan or neglected child, when the consent of the parents could be obtained. Secondary, of course, to religious instruction, the great means of reformation relied upon was agricultural employment, as at Mettray; but as here no absolute criminality could be inferred, nor punishment supposed, the family system was much more freely carried out. With this view, it was resolved that the number of children should not exceed thirty, in order that the personal, and as far as possible paternal, influence of the director over each individual might not be changed into the mere authority of a governor over the mass. The extent to which this principle has been carried out, is one of the most striking features of the establishment, and is regarded as that to which it is chiefly indebted for its successful results. The contact between the head of the house and every member of it, is immediate and constant. When I went to visit the place with a member of the society, we found M. Zweifel, the director, employed, flail in hand, in thrashing out his harvest, surrounded by a dozen of his children, armed with the same instrument. The whole party were singing at their work, and merrier or happier labourers could not be seen. M. Zweifel is one of those men brought up in the severe practical school of Fellenberg and Wehali, the celebrated Swiss Agronomers, who can turn his hand to anything. With such assistance only as he can derive from one or two of the eldest boys, this one individual transacts the entire business of the whole establishment. For a couple of hours, morning and evening, he instructs thirty boys, of all ages between eight and seventeen, some of whom have to learn their letters, whilst others are advanced to the elements of land surveying. The *cahiers* shown to me of their writing, drawing of agricultural instruments from nature, plans, &c., &c., were most remarkable, when it is borne in mind that nearly all the pupils are handed over to M. Zweifel in a state of the *lowest* degradation and ignorance.

During the day he is personally engaged with them in every description of field and garden labour. By the efforts of his boys and his own, aided only by a single grown-up farm-servant, a large portion of the barren plain of Cernay has been brought into a state of high cultivation; and the example set of better and more scientific modes of agriculture has been of the most essential service to the small farmers of the locality, whilst the boon of providing them with steady and intelligent labourers is universally felt and acknowledged.

Each child of sufficient age has a small garden allotted to him, which he is taught to cultivate both with flowers and profitable produce, and which he is allowed to dispose of for his own benefit.

By his especial desire every appearance of grandeur, such as is perhaps too often found in large public establishments, is carefully avoided, the buildings and all accommodations are kept down to the level of the mere peasant's abode, only maintained with neatness and propriety. It has been too frequently found that the grandiosity of such establishments, even as that at Mettray, has rendered the inmates discontented with mere cottage life. No uniform of any kind is adopted, and the fare is exactly such as the children have been used to at home. The institution has no pretension to being more than such as every parish might establish with ease and benefit, and its object is to prevent pauperism and crime, rather than to correct them.

On the rare occasion of a holiday, the director, accompanied by the whole troop, makes an excursion to some of the neighbouring woods or Vosges mountains, invites their curiosity, and instructs them in the names and qualities of the trees, quarries, &c., which they fall in with. This life of incessant labour is led from year's end to year's end, with never-ceasing heartiness and cheerfulness, by a man evidently of enlarged mind, education, and ability, for a stipend only just raised from 1000 to 1200 francs. Nothing but being heart and soul in the work could ever induce a man to support the burden, and it says much for the system, that the initiation into it makes such teachers. In the garb of a peasant thrashing out corn, M. Zweifel handed to me copies of his letters to Ministers and Prefects, which showed him, at least, fit to be their private secretary, if not to fill their place.

The practical results of the asylum are represented in the last (seventh) report of the president of the society and the directors, as of the most gratifying description. In six years, forty-one young persons have left it rescued from pauperism, and with acquirements and habits which enable them to gain an honest livelihood—an immense boon to a small commune. All of them had been placed out by the institution, either as apprentices or with small farmers; of these, two only have turned out ill, the last case being that of a young man exceptionally admitted at the age of sixteen years, and of whom nothing could be made under a mere voluntary system.

In a country like Alsace, religious instruction was necessarily a difficulty. The asylum, though founded entirely by Protestants, has always admitted the children of Catholics, who form, indeed, the bulk of the lower population. M. Sweifel, a Protestant, and a man of the most unaffected piety, insisted upon the absolute necessity of himself, as *père de famille*, performing morning and evening prayers with all his children. The strictest care was taken that these prayers should contain nothing but what was common to both religions. But, although the attendance at mass by the Catholics was most regular, and M. le Curé, equally with M. le Pasteur, have full liberty of religious instruction offered him, I am sorry to say the Romish clergy regard the institution with an evil eye, and harass rather than protect it. Some time ago the Curé preferred a formal complaint to the Prefect against it, as a school of Protestant propagandism. A commission composed of Catholics was appointed to inspect it—the Curé was invited to make his charges, which amounted to the fact of the Catholic children having been absent from mass four times in the course of three years, and of their assembling at morning and evening prayers with the Protestants. The absence at mass was found carefully noted and explained in the daily entries of the director, and the Curé was formally reproved by those of his own persuasion.—*Guardian.*

CAUTIONS AND COUNSELS.

[*From the Handbook for Readers and Students, by Dr. Potter.*]

1. "ALWAYS have some useful and pleasant book ready to take up in 'odd ends' of time. A good part of life will otherwise be wasted. 'There is,' says Wyttenbach, 'no business, no avocation whatever, which will not permit a man who has *an inclination* to give a little time every day to the studies of his youth.'

2. "Be not alarmed because *so many* books are recommended. They are not all to be read at once, nor in a short time. '*Some travellers*,' says Bishop Hall, '*have more shrunk at the map than at the way;* between both, how many stand still with their arms folded.'

3. "Do not attempt to *read much or fast.* 'To call him *well read* who reads *many authors*,' says Shaftesbury, 'is improper.' '*Non refert quam multos libros*,' says Seneca, '*sed quam bonos habeas.*' Says Locke, 'This is that which I think great readers are apt to be mistaken in; those who have read of everything, are thought to understand everything too; but it is not always so. Reading furnishes the mind only with *materials* of knowledge; it is *thinking* that makes what we read ours. *We are of the ruminating kind*, and it is not enough to cram ourselves with a great load of collections; unless we chew them over again, they will not give us strength and nourishment.'

"A mistake here is so common and so pernicious, that I add one more authority. Says Dugald Stewart, '*Nothing, in truth, has such a tendency to weaken, not only the powers of invention, but the intellectual powers in general, as a habit of extensive and various reading* WITHOUT REFLECTION. The activity and force of mind are gradually impaired, in consequence of disuse; and not unfrequently all our principles and opinions come to be lost in the infinite multiplicity and discordancy of our acquired ideas. It requires courage indeed (as Helvetius has remarked) to remain ignorant of those useless subjects which are generally valued; but it is a courage necessary to men who either love the truth, or who aspire to establish a permanent reputation.'

4. "Do not become so far enslaved by any system or course of study as to think it may not be altered when alteration would contribute to the healthy and improving action of the mind. These systems begin by being our servants; they sometimes end by becoming masters, and tyrannical masters they are.

5. "Beware, on the other hand, of frequent *changes* in your plan of study. This is the besetting sin of young persons. 'The man who resolves,' says Wirt, 'but suffers his resolution to be changed by the first counter-suggestion of a friend; who fluctuates from opinion to opinion, from plan to plan, and veers like a weathercock to every point of the compass with every breath of caprice that blows, can never accomplish anything great or useful. Instead of being progressive in anything, he will be at best stationary, and more probably retrograde in all. It is only the man who carries into his pursuits that great quality which Lucan ascribes to Cæsar, *nescia virtus stare loco*, who first consults wisely, then resolves firmly, and then executes his purpose with inflexible perseverance, undismayed by those petty difficulties which daunt a weaker spirit, that can advance to eminence in any line. Let us take, by way of illustration, the case of a student. He commences the study of the dead languages; presently comes a friend, who tells him he is wasting his time, and that, instead of obsolete words, he had much better employ himself in acquiring new ideas. He changes his plan, and sets to work at the mathematics. Then comes another friend, who asks him, with a grave and sapient face, whether he intends to become a professor in a college; because, if he does not, he is misemploying his time; and that, for the business of life, common mathematics is quite enough of the mathematics. He throws up his Euclid, and addresses himself to some other study, which, in its turn, is again relinquished on some equally wise suggestion; and thus life is spent in changing his plans. You cannot but perceive the folly of this course; and the worst effect of it is, the fixing on your mind a habit of indecision, sufficient in itself to blast the fairest prospects. No, take your course wisely but firmly; and, having taken it, hold upon it with heroic resolution, and the Alps and Pyrenees will sink before you. The whole empire of learning will be at your feet, while those who set out with you, but stopped to change their plans, are yet em-

ployed in the very profitable business of changing their plans. Let your motto be, *Perseverando vinces*. Practise upon it, and you will be convinced of its value by the distinguished eminence to which it will conduct you.'

6. "Read always the *best* and most recent book on the subject which you wish to investigate. 'You are to remember,' says Pliny the younger, 'that the most approved authors of each sort are to be carefully chosen, for, as it has been well observed, though we should read much, we should not read many authors.'

7. "Study *subjects* rather than books; therefore compare different authors on the same subjects; the statements of authors with information collected from other sources; and the conclusions drawn by a writer with the rules of sound logic. 'Learning,' says Feltham, 'falls far short of wisdom; nay, so far, that you scarcely find a greater fool than is sometimes a mere scholar.'

8. "Seek opportunities to *write* and *converse* on subjects about which you read. 'Reading,' says Bacon, 'maketh a *full* man, conversation a *ready* man, and writing an *exact* man.' Another benefit of conversation is touched upon by Feltham: 'Men commonly write more formally than they practise. From conversing only with books, they fall into affectation and pedantry;' and, he might have added, into many mistakes." 'He who is made up of the press and the pen shall be sure to be ridiculous. Company and conversation are the best instructors for a noble nature.' 'An engagement and combating of wits,' says Erasmus, 'does in an extraordinary manner both show the strength of geniuses, rouses them and augments them. If you are in doubt of anything, do not be ashamed to ask, or, if you have committed an error, be corrected.'

9. "Accustom yourself to refer whatever you read to the general head to which it belongs, and trace it, if a fact, to the principle it involves or illustrates; if a principle, to the facts which it produces or explains. 'I may venture to assert,' says Mr. Starkie, speaking of the study of the law, and the remark is equally applicable to other studies, 'that there is nothing which more effectually facilitates the study of the law than the constant habit, on the part of the student, of attempting to trace and reduce what he learns by reading or by practice to its appropriate *principle*. Cases apparently remote by this means are made to illustrate and explain each other. Every additional acquisition adds strength to the principle which it supports and illustrates; and *thus* the student becomes armed with principles and conclusions of important and constant use in forensic warfare, and possesses a power, from the united support of a principle, fortified by a number of dependent cases and illustrations; while the desultory, non-digesting reader, the man of indices and abridgments, is unable to bear in his mind a multiplicity of, to him, unconnected cases: and could he recollect them, would be unable to make use of them if he failed to find one exactly suited to his purpose.'

10. "Endeavour to find opportunities to *use* your knowledge, and to apply it in practice. 'They proceed right well in all knowledge,' says Bacon, 'which do couple study with their practice, and do not first study altogether and then practise altogether.'

11. "Strive, by frequent reviews, to keep your knowledge *always at command*. 'What booteth,' says an old writer, 'to read much, which is a weariness to the flesh; to meditate often, which is a burden to the mind; to learn daily, with increase of knowledge, when he is to seek for what he hath learned, and perhaps then, especially when he hath most need thereof? Without this, our studies are but lost labour.' 'One of the profoundest and most versatile scholars in England,'* says Mr. Warren, in his Law Studies, 'has a prodigious memory, which the author once told him was a magazine stored with wealth from every department of knowledge. "I am not surprised at it," he added, "nor would you be, or any one that knew the pains I have taken in *selecting* and *depositing* what you call my 'wealth.' I take care always to ascertain the *value* of what I look at, and, if satisfied on that score, I most carefully stow it away. I pay, besides, frequent visits to my 'magazine,' and keep an inventory of at least every thing important, which I frequently compare with my stores. It is, however, *the systematic disposition and arrangement* I adopt which lightens the labours of memory. I was by no means remarkable for memory when young; on the contrary, I was considered rather defective on that score."

12. "*Dare to be ignorant of many things.* 'In a celebrated satire ("The Pursuits of Literature"), much read in my youth,' says De Quincy, 'and which I myself read about twenty-five years ago, I remember one counsel there addressed to young men, but in fact of universal application. "I call upon them," said the author, "to *dare* to be ignorant of many things"—a wise counsel, and justly expressed; for it requires much courage to forsake popular paths of knowledge, merely upon a conviction that they are

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* Lord Brougham.

not favourable to the ultimate ends of knowledge. In you, however, *that* sort of courage may be presumed; but how will you "dare to be ignorant" of many things, in opposition to the cravings of your mind? Simply thus: destroy these false cravings by introducing a healthier state of the organ. *A good scheme of study will soon show itself to be such by this one test*—that it will exclude as powerfully as it will appropriate; it will be a system of repulsion no less than of attraction; once thoroughly possessed and occupied by the deep and genial pleasures of one truly intellectual pursuit, you will be easy and indifferent to all others that had previously teased you with transient excitement.'"

FASHION IN WORDS.

THERE is a fashion in words, as well as in dress, or in food, or in medicine. Men and women dress and feed and physic themselves according to *modes* which come in, no one knows how, are taken up no one can tell why, and are laid down when they are worn out. The fashion of words, like other fashions, will of course have its follies and its whims. Men will talk and write absurdly as well as dress so; and woe betide the unhappy word that anyhow gets to be a pet of the newspaper press!—there is no end of the duty it has to do. Some new or foreign word is introduced, or some new use of an old one, and then it is sure to meet us at every turn, fitly or unfitly—repeated in all connections and over and over again, as if that was the very word the world had been in want of in all ages since Adam gave names to all cattle, and to the fowl of the air, and to every beast of the field, or since language was confounded on the plain in the land of Shinar. Men use the new term as if they had to make up for the want of it so long, or as the child with its new watch takes such frequent note of time. For the most part, these follies of fashion in words are simply ludicrous and short-lived corruptions of speech, which we might be well content to smile at and say nothing. But sometimes there is another objection to them; and it is this that leads us to say a very few words on the subject—by way at least of protest. There are words which have become specially familiar to the eye, to the ear, and to our thoughts, in their scriptural use, or by connection with some holy theme of our faith. To such use, it is true, they are not limited, but admit of other applications. Still, from long association—such as greatly controls our thoughts—they are chiefly thought of in their sacred use. Now what seems to us worthy of remark and of reflection is, that this sacred use may become impaired, and the sense of reverence unconsciously weakened or confused by use of a colloquial kind, and for other purposes at the same time. This diversion of the words from their sacred and scriptural employment is in most cases wholly unnecessary. Our speech is copious enough to save us from thus putting the word on double duty—one duty in things appertaining to heaven, and another in things appertaining to earth. Our meaning will, perhaps, be clearer, when exemplified by such words as "*exodus*," "*advent*," and "*incarnation*,"—all susceptible indeed of other uses besides those which associate them so intimately with holy doctrine and history. They have, as it were, a savour of the Bible about them, and is it not better that that should be kept intact and pure from any other, and necessarily lower, association? The migration that is constantly going on from Ireland was called by somebody or other an *exodus*, and certainly it is a great *going-out* of a people, but we would rather leave the term alone in the Bible, although the angry Celt, looking back to Great Britain as a land of Pharaohs, and looking forward to America as a land of promise, may find a fitness in it. But this pet word seems to be in a fair way of being employed to express any sort of emigration or out-going. The other day, when President Pierce and his secretaries left Washington to attend the opening of the Crystal Palace at New York, the Government newspaper spoke of "*the late exodus of the President and his Cabinet.*" Surely the folly of fashion cannot go beyond this; and having patiently borne the abuse up to such a point, we make this effort to relegate the word to its old-fashioned and Bible service.—*The Register* (American Paper).

To Correspondents.

Mr. Levy's article will appear in an early Number.

If our Yorkshire correspondent will favour us with his solution to the question he refers to in the "Student," his request shall have due consideration.

HINTS ON THE PRESERVATION OF THE HEALTH OF THE TEACHER AND PUPIL.

(*Continued from p.* 360.)

The facetious writer of "Tristram Shandy" compared the connection between the body and the mind to that existing between a coat and its lining, —" if you rumple the one, you rumple the other." This homely expression is as true as it is quaint, and characteristic of its author; and we now come to consider the means best calculated to keep the body in good health, and free from "rumple," that the mind may be in a state fitted for useful and profitable exercise.

The term hygiene (from *υγιαινω*, *I am well: vide* Hooper's Med. Dict., *υγιαινω*, I am well) includes a variety of subjects and considerations, differing according to the age, sex, climate, temperament, and occupation of the individual; but it is a subject which demands attention, at present only, so far as those of studious and sedentary habits are concerned.

It has been shown, that no one organ can be long and constantly exercised whilst others are neglected, without leading to some evident derangement of health; and that such derangements are, in severity and significance, proportioned to the importance of the function of the organ overtaxed or abused.

Now, as the brain is the organ by which the teacher imparts knowledge, and by the use of which the pupil receives and retains it; and as the brain is also the grand centre of the nervous system, governing the action of the heart, and consequently indirectly affecting the nutrition and repair of the whole body, the first thing to be considered is the means by which its integrity may be preserved. But it is necessary, for the nutrition and repair of the brain itself, that its vessels should receive a regular and sufficient supply of pure blood; and as the blood is sent through the lungs to be purified and vitalized, it is evident that the inhalation of a pure and wholesome atmosphere is a consideration of great importance.

Without going into any minute analysis of the atmosphere, it will be sufficient for our purpose to state, that its fitness for the purposes of life depends upon a proper proportion of the element called oxygen, and that its impurity is consequent upon its containing too much carbonic acid and other noxious gases. When the lungs are expanded with air during the act of inhalation, a chemical process takes place. The oxygen of the atmosphere combines with the blood and displaces the carbon with which it has become charged while circulating through the body; and this carbon becoming combined with a certain amount of oxygen, is exhaled in the form of carbonic acid gas. And as a certain amount of heat is evolved during this process, the chemical changes which take place in the lungs during the processes of inhalation and exhalation have, with every appearance of truth, been assigned as the source of animal heat—the natural heat of the body. That carbonic acid is given off during the act of exhaling may be proved by a very simple experiment. Take a glass containing a portion of common lime water, and on breathing several times upon the surface of the fluid it will be found coated with a thin film of carbonate of lime (common chalk). The formation of this white film is explained thus: The lime water contains a small portion of pure lime, *in solution;* but the moment it comes in contact with carbonic acid, an *insoluble* compound, carbonate of lime, is formed, and for a time floats on the surface of the water.

If the glass containing the lime water is exposed in a crowded school-room, or in any other place where several people are breathing at the same time, it will soon become milky, and deposit a sediment composed of common chalk. That the inhalation of carbonic acid gas, or of carburetted hydrogen, is poisonous has been repeatedly and fatally proved, by the effects of charcoal or coke-burning stoves, in churches and other large buildings, stupor having instantly come on, and death from asphyxia quickly followed its inhalation.

Being a daily attendant at the Pauper Infant Establishment at Tooting, in Surrey, in the year 1849, when nearly 300 young children in a very few days became victims to a peculiar form of cholera, the predisposing causes to which were crowded dormitories and impure air, (not want of food, as was reported and believed at the time,) we had a fair opportunity of noting the manner in which their effects were produced, and, we hope, of collecting a few facts which may be of service to others who have a number of children under their care.

The first consideration, then, regarding the health both of teacher and pupil, is air—pure, fresh, wholesome air—without which even the vegetable kingdom droop and fade; and the deprivation of which on the human subject vitiates and depresses the whole system, and renders it obnoxious to various debilitating diseases. And it must be remembered, that as the young sapling is nipped by the frost, and broken down by the gale which whistles harmlessly among the boughs of the sturdy oak; so the young require more of the invigorating influence, and more readily suffer from the want of a wholesome atmosphere, than the healthy adult. In a well-conducted school there is always sufficient time for the enjoyment of fresh air in the intervals between the hours of study; and the only precautions necessary to be observed during the day, are to prevent the temperature of the school-room from becoming too high, and to take care that its occupants are not exposed to sudden transitions from heat to cold. We are not advocates for many of the hardships which some boys are made to undergo during the winter months, on the plea of "hardening" them; but it certainly seems more conducive to health, that a robust boy should be able to warm himself by active exercise in a good open play-ground, than by nestling over a fire; besides, the increased circulation and general warmth induced by exercise is an excellent preventive of chilblains and other painful wintry reminiscences. Great attention should be paid to the ventilation of the dormitories in which boys sleep, for, during the night, more air is breathed, the temperature of the body increased, and more impurities are thrown off from the lungs and the skin than during the day: hence the number of occupants for a sleeping-room should be limited to that for which the apartment will contain a sufficient quantity of air to supply the night's consumption, and the room should also be so provided that at any time a current of air may be made to circulate through it. A dormitory, in addition to a door and a fire-place, should (if a long room) have windows on each side, contrived to open at the top; so that they may remain open all day during favourable weather, and, if necessary, during the night in close and sultry states of the atmosphere, without exposing the inmates to a draught of air.

In a room ten feet high there should be at least six clear feet of space between each bed; for more reasons than one, each boy should have a bed, without *curtains* or *hanging* of any kind, to himself; each boy, on leaving his bed in the morning, should be directed to throw all the clothes off his bed, as by these means the sheets, &c., become exposed to air, and the proper re-making of the bed is insured. The chamber-maid should be obliged to perform *all* her duties in a strict and cleanly manner; none of the apparel worn during the day should be allowed to be used as a covering during the night, and the boys themselves should be taught to be as cleanly as possible in their habits. By the observance of these and other precautions, founded on the principle *that the same air should not be twice inspired, and that all exhalations from the human body should be avoided*, the morning will bring with it new vigour and mental aptitude for the studies of the day, the result of healthful and refreshing slumber; but if, on the other hand, the application of the above-mentioned principle is neglected, the sleepers will awake with a furred tongue, an unpleasant taste in the mouth, heavy eyelids, and general drowsiness and debility, showing the depressing effects of impure air on the brain and nervous system. If this state of things is allowed to continue, the ruddy hue of health will soon give place to the paleness of debility; bowel complaints, sore heads, and other skin diseases will become prevalent, and there will always be some unfortunate pupil on the sick list.

Exercise is closely allied to fresh air as a means for promoting health, and next requires to be considered. So much has been written on this subject, and so many kinds and systems of exercise have been devised, that little need be said at present. Healthy boys can always find plenty of outdoor sports to amuse them at all times of the year, and within proper bounds those kinds of athletic amusements in which they feel an interest, and which are only governed by "the laws of the game," appear to be more calculated to relax the mind and invigorate the body than any system of calisthenics. A systematic course of exercise savours of restriction, and the term itself has not a very amusing sound. Care should be taken that those of high spirit, but feeble body, do not overtax their physical energies in their attempts to equal or excel those of stronger frame. The lifting of heavy weights, and games in which the head hangs downwards, should be interdicted: from the former, injuries of the loins and rupture have resulted; from the latter, a disordered state of the circulation within the head. Those kinds of sport should be encouraged which tend to open the chest and exercise the muscles of the chest and shoulders; by exercises of this kind the tendency to stooping and hanging the shoulders forward upon the chest, to which boys are prone when sitting at their desks, is counteracted; and the lungs being properly expanded receive their full quantity of air. To adults, and likewise to boys of sufficient maturity, when convenience is at hand, and they are under competent care, swimming is an excellent exercise: it calls into play all the muscles, especially those of the chest and arms; expands the lungs; cleanses the skin; and, even apart from these considerations, is always a pleasing and often a most valuable acquisition.

The next subject to be noticed is the important one of diet; and, "*in limine*," a short quotation from Boerhaave's Commentaries will express a great deal of meaning, and show the absurdity of many popular fallacies on this subject. He says: "To say that any article of diet is wholesome or unwholesome, without knowing the constitution and circumstances of the person for whom it is intended, is like the sailor saying the wind is fair or unfair without knowing the port whither he is bound."

The good old simple rule for the diet of schoolboys is good, plain, nutritious food, in moderate quantities at regular intervals. If speaking of the diet proper for the healthy adult, the word "substantial" might be introduced: but as this term has sometimes been applied to very heavy and indigestible substances, it appears to be somewhat ambiguous and indefinite; besides, it will readily be admitted, that if any article of food is good and nutritious, it is likewise sufficiently substantial. There are those who advocate the indiscriminate feeding of children; and we once heard a worthy coroner from his chair of office state, "that children put out to be taken care of, should, as regards food, be treated like horses turned out to grass, and allowed to eat as much as they liked." But those who advocate this plan forget two very important considerations: 1st, that the stomach, like every other organ and part of the body, requires a period of repose after active exercise; and, 2nd, that the stomach will only furnish gastric fluid sufficient for the digestion of a quantity of food proportioned to the wants of the system, and that any excess remaining in the stomach after this process is completed becomes a source of irritation, and undergoes decomposition and putrefaction the same as other organic substances do when exposed to the influence of warmth and moisture. It has been before stated, that the stomach is dependant upon the brain for a sufficient supply of nervous energy wherewith to perform its functions; and that hunger, or the desire for food, is entirely a nervous sensation, and dependant on the same influence, is proved by the fact, that the emotions of joy or grief, or the sudden receipt of unwelcome news, will instantly destroy the most ravenous appetite. Now, from these facts an important and applicable precaution may be deduced: it is, that boys should not at once run from the school-room to the dining-hall, but that a short time should be allowed for the stomach to receive its share of nervous power before being called upon to perform the act of digestion. When this precaution is neglected, hiccup, and pain as the food is swallowed, showing irregular contraction of the stomach, is a common result. It must also be borne in mind, that the stomach acts but feebly upon large or undivided masses of food, and therefore great care should be taken that boys masticate their food well; not bolt it, as many youngsters do, either from pure greediness or from a desire to despatch the meal as quickly as possible.

That the process of digestion may be perfectly performed, it is also necessary that the intervals between meals should be of regular duration: the stomach may be habituated to a systematic exercise of its functions, and the habits upon which such a system is founded should be so arranged as to be conducive to health. The late Mr. Abernethy insisted that the stomach should not only be allowed a sufficient time to digest food, but likewise that a further period should be allowed for the stomach to rest after its labour; and his rule, slightly modified to suit the peculiar physical condition of the young, is very applicable to our subject. The stomach of a "growing boy" digests food more rapidly than that of the mature adult; and therefore the time allowed for this organ to perform its functions, and the period allotted for repose after the act is performed—the two periods comprising the intervals between meals— should be less in the boy than in the man. But in regulating the periods for taking food there are other circumstances to be considered besides those just mentioned. A boy or man, whose occupation is carried on in the open air, whose muscles are in active exercise, and whose heart, under the influence of his increased respiration, is beating rapidly, digests and assimilates his food sooner than one whose occupation is sedentary, and whose brain is working harder than his muscles. Hence, a schoolboy requires more time to digest his food, and a longer period for the stomach to recover its tone, than a youth of the same age who rambles about the fields, indulges in athletic exercises, and "whistles for want of thought." The kind of food taken at any one meal must also be taken into consideration in apportioning the period to elapse before another is eaten. For instance, the stomach will sooner, with less exertion and consequently with less want of repose, digest a light breakfast of bread and milk than a substantial dinner of beef and potatoes; and therefore the breakfast should be looked upon as a meal required to supply the loss by exhalation and secretion during the night, and dinner as the source from which the various elements necessary for the growth and support of the body should be derived, and for the assimilation of these elements a sufficient time should be given after the process of digestion is concluded. Again, healthy sleep implies rest of body, mind, nervous system, and every organ of the body, excepting those of involuntary motion—such as the heart, lungs, &c.; therefore, during sleep, the stomach should have little or nothing to do beyond the function of secreting fluids necessary for its own restoration and integrity: hence, taking a quantity of food before retiring for the night is highly improper, especially for the young. The younger a child is the more it sleeps, and the more it sleeps the quicker it grows, because the processes of growth and restoration are extremely active during sleep; and this law of nature is in force, but gradually limited, until the stature of manhood is attained. The nervous system cannot supply sufficient energy to enable the stomach to digest and assimilate food, and likewise to support the growth of the body at the same time; and therefore, during that period of life when the growth of the body increases most rapidly, the nervous system requires to be least engaged upon other employments.. Upon a consideration of these facts, some general rule may be formed to guide us in fixing proper meal-times for the young, and (making exceptions for age, sex, temperament, and previous habits,) the following appears to be founded upon correct physiological principles:—That the lighter the meal, the shorter, and the more substantial, the longer the interval; hence, the time between breakfast and dinner should be shorter than the period between dinner and the last meal of the day, and the last meal of the day should be so arranged as not to interfere with the hour of rest. If boys breakfast at eight A.M. (the food being of a light and nutritious kind), and from two to three hours is allowed for digestion, and from one to two for the stomach to rest itfelf, the dinner-hour will be about one P.M., and the last meal of the day will be between the hours of five and seven o'clock, governed by the circumstances before mentioned. A moderate quantity of food, well and properly digested, supports the system and maintains the health better than a larger amount imperfectly digested, and consequently badly assimilated; and it is a melancholy truth, that among the higher and middle classes of society more children die from the effects of over and injudicious feeding, than among the lower from privation and want of food. Leaving the individual application of the principles already explained to those who have more especially the charge of the young, we now come to consider the kinds of food best fitted for digestion and nutrition. All remarks made on this subject must be understood in accordance with the meaning of our previous quotation from Boerhaave, for boyhood being initiatory to manhood, there are the same differences of constitution and habit to be considered, although perhaps in a minor and less confirmed degree.

It will not be uninteresting to trace the various processes by which the juices of the earth become appropriated and changed, so as to constitute food fitted for the use of man. The herbs of the field and the vegetables of the kitchen-garden, in their young but minute seeds, and tender shoots, receive nourishment from the earth, and fostered by the influence of light, warmth, and moisture, become fitted for the sustenance of man and beast. Grasses and other herbage are eaten by cloven-footed and ruminating animals, and being digested, and their nutritious portions assimilated, they advance another stage in organization and become animal food; the most substantial and nutritious of the various articles of diet consumed by the only naturally omniverous animal in creation—man. And thus it is, that by the various processes of vegetable and animal life, increasing in organization as they proceed, the elements contained in the juices of the earth, and the atmosphere surrounding it, become muscles, thews, and sinews. That beautiful passage of Holy Writ, which reminds us that our mortal bodies are formed from the dust of the earth, is not so purely figurative as the careless and unthinking reader would imagine. It will be evident, from the brief sketch just given, that the lower in organization any article of food is, the less it is fitted for the nutrition *of*, and assimilation *to*, the human being. But it does not follow, that because any article of diet contains but a small quantity of nutriment in proportion to its bulk that it is likewise indigestible; nor is it in accordance with observation and fact, that the most substantial and nutritious food is at all times the best fitted for the stomach. The more perfectly organized any substance submitted to the action of the stomach, the longer is the period required for its digestion, and the greater the exertion required for the proper performance of this act; hence, food ought in its nature to be suited to the power of the stomach called upon to digest it. The stomach of the schoolboy, or the man of sedentary habits, may digest bread and milk, or roast mutton and potatoes; but would be ill at ease with the wedges of cheese, hunks of bread, tankards of ale, and slices of bacon, consumed by the ploughboy and farm-labourer. Now as boys readily digest and assimilate food, their diet should be composed of articles whose nature most nearly approaches the wants of the system, and therefore good cows' milk, being midway between the imperfect organization of vegetables and the more perfect maturity of animal life, is an excellent article of diet. Home-baked bread and good milk have been reckoned the "boy's breakfast" for generations, and a more wholesome meal cannot be furnished. If, from indulgence or habit, tea or coffee are taken, an egg, or a small portion of animal food, ought to accompany it. But milk, as containing all the elements required for the formation of bone and muscle, should be preferred. Good fresh butter, in moderate quantity, is a wholesome adjuvant for boys: in the adult, liable to dyspeptic symptoms, it may cause acidity; but the stomach of a healthy boy digests it too soon for any chemical changes to take place. The above remarks refer to the first meal of the day—breakfast—and must be modified to suit different circumstances, bearing in mind that early in the morning the stomach has not become perfectly roused from its repose, and therefore does not possess sufficient power to digest a heavy or bulky meal. After allowing a proper period of time for breakfast to be digested, and likewise for the stomach to recruit its tone, according to the principles before mentioned, the next meal to be thought of is dinner. By the hour of noon the mental and physical powers of the body have been called into active exercise, and therefore the first post-meridian meal requires to be composed of food which not only restores but likewise supports the various processes of nutrition and assimilation. Animal food is now required; and as a meal composed of a mixture of meat and vegetable is more readily digested, and furnishes more of the elements of which the body is composed, than one entirely of one or the other, some esculent should form a part of this meal.

A few remarks on the digestibility of various kinds of food will be more applicable than any general rule regarding the different articles of diet best fitted for dinner. It is quite true that man is an omnivorous animal, and appropriates productions from the animal, vegetable, and mineral kingdoms; but his organs of digestion have more resemblance to the digestive organs of animals purely carnivorous than to those of any other class. It is well known that flatulence, acidity, and other unpleasant sensations, are a common result of food composed entirely of vegetable substances; showing that they are imperfectly digested and rapidly decomposed in the stomach. Still, a mixture of animal and vegetable food is wholesome. Ripe and well-boiled vegetables contain many elements which are useful for the growth and reparation of the body; and they likewise help to dilute and assist the digestion of more solid and nutritious matters. All animal substances which have been submitted to any artificial process before being cooked become indigestible in proportion to the extent and complication of the process. Hence ham, salt beef, cured tongue, and pickled meats or fish, rendered but slightly liable to the putrefactive process by the application of agents which corrugate their fibres and coagulate their juices, become unwholesome in proportion to the length of time they are prepared to keep. Generally speaking, good middle-aged mutton, neither too near the tender flesh of the lamb nor partaking too much of the toughness of a patriarch of the flock, is the most nutritious and readily digested of all kinds of animal food. Beef is next in digestibility to mutton, and pork in any form the most unwholesome of any kind of animal food. The flesh of young animals is not so digestible as that of more mature ones, and roasted meats are more nutritious, more easily assimilated, and less liable to fermentation and other chemical decompositions, than those boiled or stewed. Indeed, stewed meats, chemically considered, are little better than portions of palatable leather. Fresh fish is by no means a bad article of diet; but the quantity of matter digested and assimilated is so small in proportion to the amount taken, that a meal composed entirely of this article, although for a period it occupies the stomach and removes the sensation of hunger, does not afford much support to the body.

The above remarks, slightly modified, apply to game, poultry, &c.; but although these lighter articles of food do not fully supply the wants of the system in robust health, they are admirably fitted for the debilitated, and in the convalescent stage of acute diseases. The nutritious portions of fish and poultry are, in their composition, very similar to the tissues of the body, and therefore do not overtax the digestive and assimilative processes. As a general rule, broths and soups are not suited for healthy boys. The portions of nutritious matter extracted from the animal substances of which the "stock" is composed are generally highly coagulated by the heat necessary for continued boiling; and the mass of warm water, flavoured with herbs and seasoned with spices, tends to debilitate the stomach and impoverish the blood.

During the epidemic of cholera in 1849-50, it was observed, that in those public establishments where broths and soups formed a considerable portion of the food given to the inmates, the disease was more fatal, and spread with greater rapidity than in those where the diet was of a more substantial nature; and since that period important alterations have been made in this matter, resulting in the improved health of the inmates of such establishments.

Boys, generally, are very fond of fruit puddings and pies, and in moderation they are not objectionable. We do not mean the half-fermented fruit and larded crust of the confectioner—but the well-sweetened contents and plain bread crust of the household cook. An occasional dessert of fresh ripe fruits is not only allowable, but, from their containing wholesome acids and other useful elements, is also desirable, especially for those of gross habit or liable to cutaneous diseases. The rinds, skins, and kernels of all kinds of fruit are not acted upon by the gastric fluids, and, therefore, ought to be carefully avoided. Sugar is a very nutritious substance, and not unwholesome in quantities so small as not to remain on the stomach and give rise to the acetous fermentation; but there is a great difference between an occasional sugar-plum and a gorge of impure plaster of Paris sweetmeats.

The quantity of food which constitutes a healthy meal varies with the kind of aliment taken and the age of the consumer. But, as a general rule, a meal short of perfect satiety is more wholesome, more easily digested, and is better fitted for an individual in whom mental activity is required, than one which burdens the stomach and requires a concentration of all its energies to perform the act of digestion. Hence, it is advisable that dinner should consist, as nearly as possible, of one kind of food, without the addition of varied and elaborate dishes; so that the appetite may not be tempted by change and variety of flavours to transgress the limits of moderation. Under no circumstances will the stomach digest more food than is necessary for the wants of the body; and as a moderate quantity of plainly-cooked animal food contains all the elements necessary for the growth and restoration of the body, it is not prudent to tax the stomach of the young to continue the exercise of its functions after it has digested sufficient aliment to supply the exigencies of the system, especially during that period of life when the mind requires a certain amount of nervous energy to enable it to manifest the faculties of memory, thought, and accurate perception in a perfect and useful manner. The sluggishness, mental inactivity, and feebleness of purpose frequently manifested in the adult, as the results of over-feeding and other sensual indulgences, ought to warn us to avoid even the appearance of such evils in the treatment of the young.

Boys are not often remarkable for correct judgment and prudent foresight, and therefore it is not improbable that, if allowed the unrestrained indulgence of their appetites, they may follow the example of some of their seniors, and "take an enemy into their stomachs to steal away their brains." Simplicity and moderation in diet has a great deal to do with mental superiority and sound education. It is scarcely necessary to remark that pure, fresh spring water is the most wholesome beverage for youth. As a means of diluting and assisting the digestion of the contents of the stomach it answers every useful purpose, and is easily absorbed to renovate the various fluids of the body. Where, from home indulgence, boys have from an early age been habituated to the use of wine and malt liquors, it is not prudent all at once to withhold them; but, when the system has become accustomed to scholastic habits, they are no longer necessary, and ought to be discarded. W. P.

PAPERS ON PHYSICAL GEOGRAPHY. No. 6.

THE OCEAN—*continued.*

We have briefly indicated, in two previous papers, a few of the more important characteristics which belong to the sea, and which lend so striking an interest to the inquiries connected with its depth, its movements, and its influences (through the medium of the superjacent atmosphere) upon the climate of maritime regions. These circumstances, and the laws which they bring into operation, are best studied by reference to the wide and open portions of the ocean, where winds and waves hold their joint and unimpeded sway. But there are phenomena of other kinds connected with the action of the sea, which relate to the immediate points of contact between land and water, and which are scarcely less important in their consequences to man than are the more widely-extended agencies that regulate the movements of the great oceanic basins. We refer to the changes in continual progress upon the coasts of various regions, where the fall of cliffs, the gradual washing away of projecting points of land, the silting-up of estuaries, or the deposit of earthy matter held in solution by the adjacent waters, produce striking alterations in the aspect of the shores within periods of even comparatively brief duration. These changes are due for the most part to the action of tidal currents, aided by the prevailing set of the winds, and, in some cases, by the strength and velocity of rivers at the points where their streams come in contact with the sea.

The full consideration of such changes—even in reference to the shores of a single country, such as the coasts of Britain—would form an interesting and highly-instructive chapter in a comprehensive and really complete treatise upon physical geography. It is to the geologist, however, that it has chiefly been left to collect such records, and the student may be referred to the pages of Sir Charles Lyell's valuable "Principles of Geology" for the most complete body of facts bearing upon the subject. Under the head of "aqueous" changes, (as distinguished from those due to "igneous" causes, such as are evidenced in the action of the earthquake and the volcanic eruption,) the able geologist here named treats at length of the changes which the coasts of western Europe, and particularly of our own island, have undergone within the period of modern history.

These changes are of two kinds—*destructive*, and *reproductive*. The former destroy previously-existing land, and cause the sea to occupy its place. The latter exert a compensating agency, and convert into solid land tracts that had previously been washed by the waters of an ocean. Changes of either kind are in constant operation along our own shores, particularly upon the eastern and southern coasts of Britain, but the former appear to predominate. We lose more than we gain, in area of land, by the action of the sea upon our coasts, and hence the necessity becomes more urgent for the employment (in those cases where it is possible) of artificial means to check the ravages of the waves, and to secure fertile tracts of country, with the dwelling-places of their inhabitants, from being overwhelmed by the watery element. The labours of the engineer come into necessary contact with the forces of the natural world, and the skill of man usefully modifies powers that, if unchecked in their force, would be productive of results in the highest degree disastrous. It is thus that, as in a thousand other ways, Nature herself assists in the development of man's best powers, and (by the necessity of self-preservation) calls his mental resources into active and intelligent exertion.

Those portions of the English coast which lie between the high rock of Flamborough Head and the estuary of the Thames—embracing the low tract of Holderness, in the east riding of Yorkshire, with the coasts of Lincoln, Norfolk, Suffolk, and Essex—have been peculiarly the seat of such changes as we here advert to. The shores of Kent, Sussex, Hants, and Dorset, exhibit the action of similar changes in nearly an equal degree. Throughout this extensive range of coast, the cliffs consist for the most part either of chalk, or of soft sands and clays, which yield readily to the erosive action of water. The cliffs of Devon and Cornwall, nearer the entrance of the channel, which are composed chiefly of harder rocks, decay less rapidly; though even here, the hollow, water-worn recesses and caves, which are of frequent occurrence, show how powerful an action the ceaseless beating of the waves exerts upon the hardest materials. And the same thing is the case upon many parts of the steep, iron-bound coast which forms the seaward barrier of a large portion of Britain to the westward and northward.

Upon the coasts of Norfolk and Suffolk, many villages (and even towns) have been gradually destroyed by the successive fall of large portions of the cliffs, owing to the undermining action of the waves. The town of Cromer, upon the Norfolk coast, no longer occupies its former site, the inhabitants having been compelled to retire inland, as portions of the land have successively given way to the ravages of the sea. The entire site of the older Cromer now forms part of the bed of the German Ocean. The action of the sea is here aided by the agency of land-springs, by which large portions of the upper cliffs are frequently undermined. On the same coast, several well-known villages of former days have disappeared; manors and large portions of neighbouring parishes have been swallowed up, piece by piece; nor has there been any intermission, from time immemorial, in the ravages of the sea, along a tract of coast of twenty miles in length, in which these places stood.

In some instances, however, Nature herself erects a barrier to these and similar ravages. Between Eccles and Winterton (on the same coast; to the south-eastward,) hills of blown sand, or *dunes*, have barred up and excluded the tide for many hundred years from the mouths of several small estuaries, and similar hills of sand protect the coast between Happisburgh and Yarmouth. Immediately to the eastward of Hunstanton Cliff (at the north-eastern entrance of the Wash), hills of sand, from fifty to sixty feet high, are also formed along the shore. These are bound in a compact mass by the long creeping roots of a kind of grass (*arundo arenaria*), the same that the people of Holland use as a means of fixing the dunes which protect large portions of their own costs.

At Sherringham, to the westward of Cromer, some facts, mentioned by Sir Charles Lyell, in connection with the action of the sea on the adjoining cliffs, present a striking illustration of the infinite varieties that attend the operation of geographical phenomena in neighbouring localities. It was computed, when the present inn was built, in 1805, that it would take seventy years for the sea to reach the spot; the average yearly loss of land being calculated, from previous observations, to be less than a yard annually. The distance between the house and the sea was fifty yards; but no allowance was made for the fact that the slope of the ground was inland, or *from* the sea—in consequence of which, the waste was naturally accelerated every year, as the cliff grew successively lower, there being at each succeeding period less matter to remove when portions of equal area fell down. Between the years 1824 and 1829, no less than seventeen yards were swept away, and only a small garden was then left between the building and the sea. There is now a depth of twenty feet (sufficient to float a frigate) at one point in the harbour of that port, where, only forty-eight years since, there stood a cliff forty feet high, with houses upon it!*

At Lowestoft, in Suffolk, there has been a gradual accession of land, owing to the influence of local currents running between the coast and a shoal lying about a mile distant. The town stands on an inland cliff, of sixty feet in height: between this cliff and the sea is the low flat tract which forms the Ness, extending for nearly three miles in length, and for the most part above the reach of the highest tides. The seaward front of the Ness (which forms the easternmost point of Britain) projects from the base of the original cliff to the distance of between six and seven hundred yards.

Immediately to the north and south of Lowestoft, however, the sea continually undermines the cliffs. Thence further southward, to beyond Dunwich, the destruction of the coast is constant, and in some places of very considerable amount. Dunwich, which is now an insignificant village, was once the most considerable port upon this coast. The history of this place, and of the gradual destruction which it has undergone, is of very ancient date, extending back to the time of Edward the Confessor. Mention is made in Doomsday Book of two adjacent tracts of land having been recently destroyed by the sea. At subsequent periods, local history records the destruction, by successive inroads of the sea, of a monastery, of several churches, of the old port, of four hundred houses at one time, of the church of St. Leonard, the high road, town-hall, gaol, and numerous other buildings. In the sixteenth century, it is stated that not one quarter of the town was left standing; yet the inhabitants, retreating inland, the name was preserved, as has frequently happened elsewhere, when the original site of the place had altogether disappeared.† Here, and in similar instances elsewhere, the destruction of the churchyard exposed to view, in successive sections of the cliff, the decaying remains of mortality, laid open by the action of the waves.

At Harwich, on the Essex coast, the low point of land on which the town stands will probably (unless artificial means are used to check the advance of the sea), at no distant period, become an island. At Walton on the Naze, further south, the cliffs are annually undermined by the waves: the old churchyard of Walton has been washed away, and the cliffs to the south are constantly disappearing.

The estuary of the Humber, including the low lands of the Yorkshire and Lincolnshire coasts, upon either side, is undergoing continual and important changes. The water of the Humber is exceedingly turbid, holding in suspension large quantities of earthy sediment (or "warp," as it is locally termed), which it deposits upon the flats on either side. The alluvial deposits thus formed extend several miles inland, and their level does not exceed that of the average rise of the tide. In some places, however, a waste of land is in continual progress, which acts as a compensation for the gain of solid ground along other portions of the estuary. While large tracts that were formerly occupied by the water have been reclaimed within a recent period, in other places the channel has become considerably widened. In the upper part of the estuary, islands and banks of hundreds of acres have been formed in a few months, and have again been as rapidly removed by the water.

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* Principles of Geology, vol. i., Fifth Edition, 1839.

† Ibid.

Upon the Yorkshire side of the Humber, a large tract of land known as Sunk Island, situated some miles below Hull, exhibits a highly-interesting instance of the recovery of land from the sea. This tract is now only divided from the mainland by a narrow creek, and contains about 7800 acres, with a coast line of six and a half miles.

In the time of Charles the First, it was only a small island, comprising seven acres, and lying at the distance of a mile and a half from the shore, with an intervening channel through which large ships could pass. In 1668, it consisted of three thousand five hundred acres of land, only seven of which were embanked, while the sea, at high tide, generally flowed over the remainder. In 1744, as much as fifteen hundred acres had been embanked. In the beginning of the present century, large addition was made to this extent, and in 1833 the land under cultivation amounted to two thousand nine hundred acres. Subsequently, in 1850, further embankments were made of nearly seven hundred acres, with a prospect of still further increase.

A large portion of the matter thus deposited in the bed of the Humber appears to be derived from the coast of Holderness, where the waste of land is continual, and is brought into the mouth of the estuary with the ebb-tide. The destruction of land along the Holderness coast, where the soil consists chiefly of beds of clay, intermixed with sand and gravel, has been computed to amount to from one to four-and-a-half yards annually, the quantity varying with the particular condition of parts of the shore and with the set of the tides. Many towns and villages that formerly existed on this coast have been either partially or entirely destroyed, and others are at present undergoing a similar fate. At Hornsea, a street called Hornsea Beck had, even in Pennant's time, " long since been swallowed up." The east end of Hornsea church was, in 1786, distant from the sea 1133 yards; in 1836, this distance had diminished to a thousand yards; and, at the present time, is only 942 yards: showing an average loss of land, within the last seventeen years, exceeding ten feet annually. Many similar instances, along the same coast, might be quoted. The most rapid loss is going on at Kilnsea: the church fell in 1786, and the village is fast disappearing; the Blue Bell Inn, built in 1847, was 534 yards from the sea, but is now only 488 yards.* Spurn Point, a low spit of land which protects the northern side of the entrance of the Humber, is already nearly insulated, and appears likely to become entirely so ere long—a change which may be productive of important consequences to the neighbouring coast, by the additional communication which would thus be opened between the estuary and the waters of the German Ocean.

The geological changes on this and other portions of our coast connect themselves with many not unimportant events in English history. Among places formerly situated on the shores of the Humber, that have been destroyed by the sea, was Ravenspurn (or Ravensper)—situated on the Yorkshire coast—of which every vestige has long since disappeared; nor has any record of the precise time and manner of its destruction been preserved. This place was once a considerable port, the rival of Hull, and of sufficient importance to send members to parliament in the reigns of the first three Edwards. In 1332, Edward Baliol and the confederated English barons sailed from Ravenspurn for the invasion of Scotland, and the same place was on two occasions selected as a point of debarkation by successful claimants of the English crown; in 1399, when Henry Bolingbroke raised his standard against the second Richard, and in 1471, when Edward of York returned from his forced exile to occupy a throne which the genius of the "king-maker," Warwick, had bestowed for a time upon the sixth Henry.

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* Some of these particulars, respecting the Yorkshire coast and the estuary of the Humber, are taken from papers read at the recent meeting of the British Association at Hull.

Upon the Kentish side of the estuary of the Thames considerable changes have taken place, and are still in progress. The cliffs on the north side of the isle of Sheppey, which are from sixty to eighty feet high, decay rapidly, and large portions of the adjacent land have been overwhelmed within the last twenty years. The church at Minster, now near the coast, is said to have been in the middle of the island half a century since. Herne Bay, further to the eastward, appears to have derived its name from headlands, or prominent parts of the coast, which have subsequently been swept away.

The well-known church of Reculver, still further east, which forms a conspicuous landmark to the navigator, marks a similar change. This church stands on the summit of a cliff composed of clay and sand, which has been preserved from further destruction by artificial means—part of the churchyard, and the whole adjacent village, having been washed away by the sea. The village of Reculver occupied the site of the Roman *Regulbium*, an important military station. In the time of Henry the VIIIth, it appears to have been nearly a mile distant from the sea. Some time previous to 1780, the waves had reached the site of the ancient Roman fortification, the walls of which—firmly cemented into one mass—continued to overhang the sea long after they had been undermined.

The cliff of Reculver stands near the commencement of the Isle of Thanet—a tract which now scarcely possesses any proper claim to be called an island, though it was formerly divided from the land by an estuary of considerable width, formed by a northern branch of the Stour. It is said that the Roman fleets sailed through this channel, now diminished to a mere ditch, running through marsh land. Along the entire coast of the Isle of Thanet a continual fall of the chalk cliff takes place.

Other portions of the Kentish coast, as well as the neighbouring coast of Sussex, exhibit changes of a like character. In some places there has been a gain of land, as in the instances of Romney and Dunge marshes, which have received considerable additions. The town of Rye—an ancient cinque-port—to the west of the latter tract, is now two miles distant from the sea, though formerly subject to its inroads. The neighbouring port of Winchilsea—similarly distinguished—has undergone various fluctuations of a like kind. The older town which bore the name was overwhelmed by the sea in the latter part of the thirteenth century. The later Winchilsea, which at one period possessed considerable commercial importance, has suffered from an opposite cause—the retirement of the sea—and has long ceased to be anything more than a village, without trade of any kind.

We have adverted, for examples of the natural changes produced by the agency of the sea upon the land, to portions of our own coasts, as falling within the reach of familiar experience, and thus possessing a more direct interest than belongs to similar phenomena elsewhere. But the neighbouring coasts of Holland and Germany furnish like instances of change, upon a scale of greater geographical extent. The immense gulf of the Zuyder Zee, which measures between forty and fifty miles in either direction, was formed by successive irruptions of the sea during the thirteenth century. A portion of its site was anciently occupied by Lake Flevo, an inland body of water, formed by the inundation of the Rhine over the adjacent marshes. The sea burst successively over the intervening lands, forming several channels of communication with the inland waters, which were at length widened into the present broad entrance of this extensive basin. The whole line of the Dutch coast presents the evidence of similar changes, and the islands which extend from the Helder to the mouths of the Weser and the Elbe have undergone repeated alterations of form and size. The large gulfs of the Dollart and the Jahde owe their existence to inroads of the adjacent waters, having both been formed at various periods between the eleventh and the seventeenth centuries. The western coasts of Denmark have been similarly exposed to the ravages of the ocean. During a violent storm, in 1825, the sea broke through the narrow isthmus by which the Lym Fiord (in the northern part of Jutland) was terminated to the westward, the waters of the North Sea thus forcing for themselves a communication with the channel of the Kattegat. The passage thus formed has since remained open, though it does not possess sufficient depth to be much used for the purpose of navigation.

Among important changes of another description are those connected with the formation of new land at the mouths of rivers, or with the addition which the continual deposit of fluviatile sediment makes to the *deltas* of such rivers as the Nile, the Ganges, the Mississippi, the Rhone, and others. But the consideration of deltas belongs rather to the subject of rivers than of the ocean, and may perhaps form the topic of inquiry in a future paper.

In the brief and imperfect glance which has been taken at the subject here adverted to, enough (we trust) has been said to show that—like so many others among the multifarious topics which physical geography embraces—it possesses an interest of no ordinary description, and one well calculated to arrest the attention of the youthful and inquiring mind. It may be true that a knowledge of such subjects cannot, in *all* cases, be included within the ordinary range of education, limited as class-instruction necessarily is by various considerations, many of them of a technical character. But this constitutes no reason why they should not be studied wherever the opportunity *does* exist; nor why the *teacher* should not, in every case, bestow some portion of thought upon them, and strive to make himself familiar with their details. The teacher, in order to discharge his duties adequately, should *know* a great deal more than (in the ordinary requirements of the school-room) he may be called on to *teach*; and he should be thoroughly informed upon the details of many subjects of which he may, in the usual order of things, only have to teach the outlines. In the absence of such superior knowledge, teaching becomes a mere routine, and the influence which a well-trained and amply-stored intellect can exert over the learner's mind has no existence. Every new fact that is added to the store of knowledge constitutes a positive gain, and one that, under proper guidance of the moral senses, may be applied to good and useful purposes. In a yet higher degree, every inquiry into those laws that regulate the natural world, if rightly conducted, becomes productive of beneficial results, since it leads the mind to a fuller and truer appreciation of the marvellously-varied powers that are at work in the beneficent scheme of creation, and that have been called into existence by an over-ruling and sustaining Providence. The storm and the earthquake are a part—and but a small part—of the general economy of the natural world; and their results, while they awaken the admiration and awe of man, lead also to the culture and development of the higher faculties of his mental and moral being. W. H.

ON RENDERING OUR NATIONAL SCHOOLS INDUSTRIAL.

(Continued from p. 374.)

We have shown in a former Number that to render National Schools industrial is in accordance with the original design of the founders of the National Society, and affords an invaluable opportunity of applying at the earliest period, to actual life, the religious and moral principles taught in our schools; and that, in the case of those who are to live by the labour of their hands, a regular training in good habits necessarily includes industrial occupation as a means of giving a taste and aptitude for such employment. Thus, although it may not be possible to train boys or girls at school to be perfect labourers or perfect servants, yet both may there learn the elements of profitable industry in their respective departments, and become apt instead of inapt for industrial pursuits. We also observed that such a system, by attaching value to school-instruction in the estimation of parents, would make them more desirous to keep their children longer under it, and so render their instruction less superficial; and that, even where actual practice in works of industry cannot be introduced, the same end may be promoted by introducing into the ordinary school-instruction such practical information as will be very useful afterwards to working-class boys and girls. We now propose to endeavour to confirm the truth of these remarks, by some instances of the successful manner in which instruction in works of industry has already been introduced into our National and other schools.

The National and Industrial Schools of the Trinity District at Finchley furnish the best and most encouraging example that we can produce. They specially deserve notice, as well on account of the able and successful manner in which they have been planned and are now supported and carried out, as because we are indebted to their founders for several most excellent "Manuals of Industry," the publication of which cannot fail of greatly facilitating the general introduction of instruction in works of industry into our National Schools throughout the kingdom. The Government Inspector, the Rev. F. C. Cook, in his general report for 1852, states, that "at Finchley the results of the last year's exertions are highly satisfactory; a large piece of ground is brought into a perfect state of cultivation; the elder boys supply their parents with a quantity of vegetables, and earn a sufficient sum to convince them that the benefits of their training are of a really practical character. An entire class of boys above twelve years of age, who would certainly have been withdrawn from school under any other system, are receiving an excellent education; in addition to the usual subjects in which they are well instructed, they learn the elements of general and of agricultural chemistry, and have both a theoretical and practical acquaintance with the principles on which the fertility of various soils depends. The master is an intelligent man, who feels much interest in this department of the work, in which he is effectively assisted by two pupil-teachers." He also speaks of the completeness of the laundry at Finchley, and mentions that the girls learn the manuals of needlework, cookery, &c., and are instructed in the preparation of food, cooking their own dinner on the days when they are employed in the laundry. And, speaking generally of the girls' schools under his inspection, he states that it is now very generally the custom of those mistresses, who from experience or special training possess the requisite information, to give collective lessons on domestic economy, to the great benefit of the girls, and to the general satisfaction both of their parents and of the school-managers.

In the "Plea for Industrial Schools," by one of the Editors of the Finchley Manuals, to which we referred in a former Number, and which contains a full account of the Finchley schools, it is stated to have been a part of the original design of their founders to engraft the industrial on the national system of education, by interpreting broadly the admonition, "Train up a child in the way he should go." They consider it to be their duty, so far as their power may extend, to have the poor children "trained and instructed at school in such manual crafts and occupations as are fitted to develop health and strength, and to impart habits of order, neatness, dexterity, punctuality, and industry, no less than to inculcate the principles of morality and religion. They believe that systematic instruction and training at an early age, in manual employments, will tend more to make the scholars handy and useful, valuable as servants, mechanics, agricultural or general labourers, or farmers; and that, by thus endowing them with a knowledge of common things, and thoroughly instructing and exercising them in such employments as may fall to their lot in after-life, they will instil both the disposition and the ability to perform their duties well." With these views they erected National and Industrial Schools, which were finished in 1848. The industrial part consists of a commodious workshop, manure tank, washhouse, furnished with cisterns, coppers, and washing troughs, with pipes for hot and cold water; a laundry, with ironing-stoves, mangle, and other necessaries; a drying room, with hot-air apparatus; a kitchen, with requisite furniture, bakehouse, and store-room.

In the September Number of our Journal for 1852, p. 361, we gave some extracts from the report of the Finchley schools for 1851. In that report it is mentioned that the boys are employed in practical gardening every Tuesday morning from half-past ten to twelve, and every Monday, Wednesday, Thursday, and Friday, from half-past four till half-past five. The gardening boys are divided into two classes of twenty each. The senior class receives regular instruction in the science and practice of horticulture, and in the use and producing qualities of manure. The time taken up in this instruction is in addition to the ordinary hours of National Schools, of which, with the addition of the half-day on Saturday, they have more than is usual in other schools. The junior twenty boys cultivate their gardens, and are taught in the intervals of school-time under the superintendence of one of the pupil-teachers. No time is lost here that is ordinarily given to National School education, and in two ways much more is gained. The first is, by the greater number of years the children remain at school, owing to the inducement held out from the present produce of their labour, and the very evident future benefit to the children, by the valuable practice and maxims instilled into them. The other way in which the instruction is increased, is by the adoption of Saturday as in part a school-day. On the Saturday the industrial work is carried on, superintended by the master, instead of the day being spent, as it formerly was, in idling about and joining company with vicious and rude boys from town, to the increase of every kind of depravity. The evil of an entire holiday on Saturdays has been seen by the number of juvenile criminals brought before the magistrates every Monday morning. The boys in Saturday situations are of course allowed to attend them. That the adoption of Saturday as in part a school-day is very important, none who have watched the use of this one idle day can for a moment doubt, and that on it the good instruction of the week has often been in a great measure made of none effect—the children being at liberty during it to associate with bad companions of their own age, and sometimes older, who are not sent to school.

The following extract, from the report of the progress of the industrial schools through 1852 and up to the present time, will give some idea of their working:—

“ There are now twenty plots of ground, of two poles each, under cultivation by the boys for their own profit. In these gardens they are occupied five hours out of thirty-three school-hours in each week; and, in addition, they are allowed to spend as much of their own time in them as they please. The produce of their respective plots for the past year proves the great advantage thus afforded to the boys, not only by instructing them in the theory and practice of gardening, the nature of soils, use of manures, &c., but also as a source of profit. There is also a carpenters' class in operation, in which the senior boys are taught to make themselves acquainted with the rudiments of that useful trade. Many of the articles required for the use of the school are made and kept in repair by them. During the last year they have erected pig-styes, for the purpose of learning the best and cheapest mode of keeping those valuable animals. Another class is instructed in painting and glazing; and a tailors' class is in progress of formation, in which the boys will be taught not only to mend their own clothes, but also to keep in repair those of their schoolfellows who may feel disposed to avail themselves of their services. It is not intended to introduce into these trade-classes any but the senior boys, whose education is advanced, so that a few hours may be subtracted from their ordinary school-time without any detriment to their religious and secular training. The girls are taught all the varieties of household work: baking, cleaning, cooking, plain-work, washing, &c. Their progress is equally satisfactory as that of the boys.”

The following account shows the produce of the boys' work for 1852, and the surplus beyond the expenses. The vegetables are calculated at the market price; and the carpenters', and painters', and glaziers' work at the prices at which the committee would have had to pay tradesmen for performing it. The industrial boys are twenty in number.

“ *Dr.* *Gardening.*				*Gardening.* *Cr.*			
To the rent of 20 gardens, at 1*s.* per pole	£2	0	0	By the produce of the allotments given to the boys	£20	5	3½
Expense for seeds, &c.	2	1	4				
	4	1	4	*Carpenters' work.*			
Carpenters' work.				Making and repairing articles for the house and schools	3	6	5
Wood, nails, &c.	1	15	11	*Painting, Glazing, &c.*			
Painting, Glazing, &c.							
Paint, glass, &c.	2	1	11½	Mending windows, painting, colouring schools, &c.	4	11	11½
	£7	19	2½		£28	3	8

Leaving a clear profit of £20 4 5½.”

The industrial girls are ten in number. The result of their department is equally satisfactory; the value of the washing, &c., exceeding the expenditure for soap, the attendance of a woman, and other items. In 1852, these expenses were 8*l.* 10*s.* 4*d.*; the amount of the washing done was 20*l.* 10*s.* 2*d.* In 1852, six girls left the industrial school for situations; their ages averaging fourteen years and five months. There are now nine girls in that school, whose ages average twelve years, one month, and four days.

The number of boys who left the school for situations in 1852 was nineteen; their average ages being thirteen years, ten months, and five days. There are twenty boys now in the school, whose average age is twelve years, eight months, eleven days. Excellent accounts have been received of all those who have left.

Before these schools were established the juvenile depravity of Finchley was very great, but since they have come into operation juvenile delinquency has gradually decreased in the parish. The children in the schools, too, from the youngest to the oldest, have an appearance of cleanliness, regularity, and order, which is most pleasant to contemplate; whilst the intelligence of their looks strongly contrasts with that of the neglected wanderer in the roads or streets. What has succeeded in Finchley may be carried out in many parishes, as the Trinity district is the poorest part of the parish, and contains 1800 inhabitants, among whom the opulent persons are very few.

The good example of Finchley has been followed by the neighbouring parish of Highgate, where schools have recently been erected, in which arrangements have been made, on a large and organized system, to prepare both boys and girls in all subjects connected with industrial employment. As these schools were not at work when the inspector, Mr. Cook, visited the parish in 1852, there is no account of their inspection in his general report for that year; but he notices in it the sermon preached at their opening by his colleague, the Rev. H. W. Bellairs,[*] which he says ought to be in the hands of all who take an interest in schools, both for the principles which it advocates and the information given in the appendices. In that sermon, among other very useful observations, Mr. Bellairs recommends, in order that mental cultivation be properly carried on, that care be taken to adapt the studies to the condition in life which the children are hereafter to occupy; to train their minds during their growth, by appropriate employment; and to exercise them in such subjects as will enable them to do their work in life well. A man, he remarks, is not rich, so much from possessing useless stores, as by having at command available resources, and the neglect of this simple truth has caused much of that opposition to intellectual progress with which we have to contend. The poor know very well what kind of education will answer their purpose in after-life; and they are indifferent to all that fails of this. Hence, children should be taught the nature of those things by which they will be surrounded, the general laws by which their future operations will be conducted, and the principles of those mechanical instruments which they will be called upon to use. By becoming acquainted with the principles of the lever, and the pulley, and the screw, they will learn to make use of the common implements of husbandry at the least cost of labour to themselves, and be enabled to effect those results which can only be done by skill and correct calculations. By making arithmetic practical, and taking the exercises in it from their daily employments, they will not only learn to reason more correctly on general subjects, but will be able to apply their learning to the active duties in which they are engaged. By placing in their hands tools and implements, you will give them dexterity in the instruments of their future calling. By making them attend to cattle, and the gear belonging to cattle, you will give them an insight into the habits of animals, and the proper mode of treating and managing them. But besides these advantages, which will naturally result from such industrial occupations by the very fact of making them work in their callings, you will teach them practically that work in a man's own vocation is a proper, and therefore a religious employment.

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[*] "Work: the Law of God, the Lot of Man." A Sermon preached at Highgate, June 13, 1852. With an Appendix, containing Statements from various Schools of Manual Industry, graduated School Payments, &c., &c. (Pp. 36.) London: Groombridge and Sons. 1852.

In his general report for the year 1852 on the schools inspected by him in the counties of Gloucester, Warwick, Worcester, Hereford, and Oxford, Mr. Bellairs states, that the subject of out-door manual industry is occupying more attention in this district than it did, and that in some places the managers are incorporating it in their daily routine of school-work. In his report he reiterates sentiments similar to those which we have quoted from his sermon, declaring his own impressions to be, that out-door manual industry should form an important element in our system of national education. Our object is to train up children for their future career in life. The children of the labouring poor will be employed hereafter in manual work, either in-doors or out of doors. Out of doors occupation in the garden or the field will not be useless to the former class, and will be absolutely necessary for the latter. A national system of education which should remove children altogether from manual labour in their early years and confine them to intellectual pursuits, might answer with a nation whose population was exclusively engaged at the desk; it would not answer with us. The demand for juvenile labour interferes considerably with that course of instruction which would ensure intellectual success, and does undoubtedly deprive a great number of children of that amount of knowledge and intellectual exercise which would increase their information, their perception, and general intelligence; but it trains them up in manual dexterity and mechanical skill in the works of their calling; and in these respects fits them for their future work in life. The evil is, not that there is *a* demand for juvenile labour, but that there is so great a demand. The demand, in fact, is so great, that it presses unfairly upon the child, not only giving him that physical exercise in his future calling which is necessary, but absolutely precluding him from that intellectual exercise which is equally necessary. Out-door industrial employments, forming part of the day's school-work, have the effect of preserving this balance in the training of the labourer's child, and are, therefore, so far valuable. Besides this, when well-conducted, they accustom him to a skilful mode of horticulture or agriculture, as the case may be; they have a tendency to promote health, to develop the physical structure, and may be made a source of wealth to the children; thereby encouraging a longer residence at school. The importance of manual work, especially in out-door employments upon the soil, as an instrument of moral, mental, and intellectual training, has yet, Mr. Bellairs considers, to be seen, and that it is a question almost in its infancy.

At Eaton Bishop, in Herefordshire, the managers have made a considerable alteration in the school-hours, in order to gain time for industrial employment, which is considered to work well. The children go to school in the morning at ten, and remain until three, half an hour being allowed for dinner. By this plan they are available for manual industrial purposes both before and after the school-hours. Mr. Bellairs thinks that the plan would work better if an earlier hour of assembling were tried; *e. g.*, half-past seven or eight. On this plan the schooling would be over at half-past eleven or twelve, and the children be available for industrial purposes in the afternoon. An interval of half an hour would be necessary for recreation, and tasks should be set by the teachers to be learned at night. This last requirement would have a beneficial tendency in itself. Unhappily, it is now very generally neglected; and the consequence is, that the children come to school, day after day, with their lessons unprepared, and entail upon their teachers a heavy amount of labour which they might and should be spared.

The Rev. F. Watkins reports favourably on the school-fields and gardens in Yorkshire, towards the cultivation and superintendence of which grants of money have been made. They are yet only few in number, and are chiefly situate on the estate of the Earl of Dartmouth, whose judicious liberality, aided by the intelligent exertions of his agent and of the clergymen of the different parishes, has been the main cause of any successful results in this branch of juvenile education. The reports of the masters of these schools all agree in these important points; first, the willingness of the children to work, and the general encouragement given by their parents to this kind of labour; secondly, the actual, though small, profit of their allotments; and thirdly, the healthy effect produced on their work in school by their work in the garden, shown by their standing in the school and conduct in it. To these also may be added the practical knowledge acquired by these young gardeners of a subject which will be useful and interesting to them in whatever situation of life they may be placed, the cultivation and refinement of their tastes by more observant acquaintance with the wonderful and beautiful works of nature, and, above all, the habit of healthy industry and cheerful occupation of time, which will, by God's blessing, save them from many a temptation, and support them in many a trial of their after-life. Mr. Watkins believes that it is hardly possible to overrate either the moral or economical value of school-fields and gardens in manufacturing, quite as much as in agricultural districts of our country, which, he says, are the only industrial schools that can be attempted in most parts of it. He gives an extract from the report of the Almondbury Central National School allotments, in which the schoolmaster states, that in employing the boys in this school-garden it is so arranged that there shall be no interference with school-hours; their hours of labour being in the morning before school-time, in the evening after school-hours, and on Saturdays and other holidays. Forty-one were under industrial instruction during the past year. They are employed in this way: each boy has his separate plot of ground; the larger boys occupy a plot of sixty square yards, the smaller boys one of forty square yards, paying no rent, and finding their own manure and seeds. They take the produce; and it is a gratifying fact, that in some cases the parents have the good sense to encourage this industrial habit in their children, by becoming purchasers of the produce raised by their little hands. The cropping of these little plots is very various, but the best cultivators are generally imitated. The produce this year has, in general, consisted of the ordinary garden vegetables, and, with two or three exceptions, they had excellent crops.

The Rev. M. Mitchell, in his general report of schools in the counties of Cambridge, Essex, Huntingdon, Norfolk, and Suffolk, states that in this district small progress has been made in the introduction of industrial work into boys' schools. At Winterton, Fakenham, Saffron Walden, Kesgrave, Redenhall, and at the Industrial School in Cambridge, the boys work small pieces of land. The gardens at Fakenham are divided amongst the assistant teachers, and no accounts are kept of the receipts or expenditure. The school at Winterton, in Norfolk, has attached to it a garden-ground of three roods and thirty-six poles in extent. It is divided into two plots; forty-six rods form a common plot, on which the boys work indiscriminately, and the remainder (seventy-nine rods) is divided into seven plots, and held by the senior boys, each one having a portion. This is considered to give to each rather too much to manage. Twenty-four boys have been employed on the common plot in the last year. The first class goes out one half day in the week, under the master; the second and third each a half day, under the pupil-teachers; and the profits are shared among them, according to the number of hours that they have worked. The boys work their own plots after school-hours. Each boy keeps a separate account of the receipts and expenditure of his own plot, and the master keeps an account for the common plot. Mr. Mitchell gives a long extract from the second annual report of the Cambridge Industrial School, the substance of which appeared in our Journal for September, 1852; as (we may remind our readers) did also an abstract of the third annual report of the same school in our September number of the present year.

In the General Report for the counties of Chester, Stafford, and Salop, the inspector, the Rev. J. P. Norris, gives particulars of several industrial schools, communicated to him in reply to questions which he had addressed to their respective masters. At Acton there is a garden one and a half rood, and a field half an acre. The boys work in sets of six each, under the care of an elder boy, superintended by the master and one of the pupil-teachers alternately. They learn practically that civil, obliging manners are not to be confined to the school-room, and they take such a lively interest in the work, especially the farmers' sons, that a promise to be allowed to go to the field or garden is sufficient to excite them to double diligence at their lessons. Many of the parents have taken much interest in the work, which they have manifested by asking questions about the soils, crops, &c. They also appear to appreciate the school, as out of 175 children only twenty-nine have left in the last year. The boys have puddled a tank, and made a couple of pumps for the liquid manure, as they promised to do last year. Half an acre of flax is under cultivation besides the garden, and much attention has been given to agricultural chemistry in the school-work.

At Betley there is no field-garden, but the industrial class is hired by the neighbouring farmers to do *half-time* work on their farms, under a superintendent. Each boy receives 3*d.* a half-day from the employer. They are superintended by a paid overlooker, who works with them. The only expense is the 10*s.* a week to the overlooker, towards which the farmers pay 6*d.* a day; and the rest is at present paid by the managers. If the class were larger, his wages might be defrayed out of the boys' earnings, aided by a gratuity from the Committee of Council. "The boys are most glad to be in the class, and have certainly been more attentive at school. The parents like the plan, as their boys' earnings have helped to clothe them, and to pay the school fee. The farmers are becoming more willing to employ them, as may be seen from the great increase of work. The demand for the boys far exceeds the supply. They have been employed in weeding turnips and potatoes, topping turnips, &c., and have done very well, and given great satisfaction to the farmers, the master, the overlooker, and themselves. In a larger school the experiment would answer still better. It seems an excellent discipline for rather naughty, active, spirited boys. One of these boys seemed rather surprised that the discipline in the *field* was to be as strict as in *school*, but after a little rebellion he yielded, and is now reported "a wonderful lad for work."" Mr. Norris very properly considers that the very satisfactory progress of this experiment at Betley is deserving of particular attention. Though it needs no outlay of money, the first introduction of it into a parish may obviously be more difficult than that of the garden scheme, because it requires from the commencement the co-operation of the farmers. Once fairly tried, he feels sure it would gain every year in success and popularity, and would be productive of very great good in our country parishes, and the more so as high farming becomes more general. It would retain boys longer at school, and it would be making them at the same time handy and industrious labourers at an age when habits are best formed. And there appears to be no reason why this or garden-training should not be tried in every agricultural parish. Where the land is chiefly under the plough, the half-time scheme would probably answer the best; among dairy and grazing farms, the school-garden. In towns, there is no reason why the same principle of *half-time labour* and *half-time school*—the principle, in short, of the Factory Act (7 Vict. c. 15)—should not be generally adopted, by voluntary agreement between the school managers and the manufacturers. If it can be so arranged that the industrial labour be brought within the range of the school discipline, so much the better.

Of the extension of industrial training for girls in his district, Mr. Norris complains that he is unable to report favourably, and that people seem to have no clear notion what a girls' school ought to be; that, for the most part, they are in his district poor imitations of boys' schools, and that with the exception of a few hours of indifferent needlework in the afternoon, girls receive just the same sort of instruction as those who are to be farm-labourers and mechanics. One consequence, he says, is that there is a complaint all over his district of the great difficulty of finding good maid-servants, except in the neighbourhood of the very few schools which do exist; and the demand for the girls trained in *these* schools is so great as to involve the managers in a very extensive correspondence. But the want of good servants is not the only evil resulting from the deficiencies of the girls' schools. There are other purposes of education which these schools are failing to fulfil. The reason for educating the poor is not merely that they may be better servants to those who are above them in station, but *for their own sake*, or rather for the sake of our common Lord and Master, for whose "reasonable service," they, as much as we, need education. And we shall best improve our schools for girls, if we keep steadily in view the demands which that service will make upon them in after-life. They will have to serve God by being good sisters, good wives, good mothers, good housewives. Their life will be an in-door life; their sphere will be *the family*. Here will be their work; for this the school should distinctly prepare them. Viewed in this way, the education of girls would almost seem more important than that of boys. With us, whose welfare as a nation stands or falls with the well-being of our homes, the improvement of our girls' schools ought to be considered a national duty and necessity.

As a proof of the neglect of industrial training in his district, Mr. Norris mentions only three girls' schools under his inspection that have attempted it, but he reports the results in all the three cases as most satisfactory. At Acton, twenty girls receive instruction in cleaning, washing, and ironing; six in baking, cooking, and other household operations. The night before washing, one or two of the girls sleep at the school-house, that they may be ready to begin the work at five o'clock the next morning. The others are never later than seven o'clock, from which time till a quarter to nine they receive laundry instruction from the mistress, or one of the elder pupil-teachers. They are taught ironing in the afternoon of the following day. Five or six are generally employed at once. There is nothing peculiar in the method of teaching needlework, except that each child is made to place her own work, instead of having it placed for her by the teacher. The smallest child in the school is not allowed to take a needle in her hand till she can turn down a hem for herself. A great deal of work is done for distribution among the poor. The school turns out good servants, and the estimation in which it is held by the parents is shown by the fact that out of 164 only 27 have left in the last year.

Our limits will not allow us to offer any comments of our own upon the foregoing examples of the introduction of industrial instruction into our schools for the poor. But, although we have already availed ourselves so largely of the reports of her Majesty's inspectors, we are unwilling to lose this opportunity of adding, in conclusion, the recorded opinion of the Committee of Council upon instruction in works of industry, as quoted by one of the inspectors in his Report for 1852:*—

> "The object of industrial instruction should be the same as that from books; namely, to fit the learner for doing his best in life, not to prescribe definitely his sphere in it. In the case of boys, labour upon land fulfils, in a higher degree than any other kind of employment, all the essential conditions of good industrial training. It is the most healthy of any; it teaches the use of all common tools and implements, including (in the repair or construction of out-buildings) many of those belonging to the carpenter and the mason; it affords unlimited scope for collateral information; and makes working men handy and fertile in resources, for adding to the comfort and decency of every-day life in their homes. In the case of girls, household labour of every kind, including dairy-work where the locality admits of it, is the proper subject-matter of instruction. Sewing, knitting, and cutting-out, are generally taught now; and an intelligent mistress may, without any additional or special apparatus, also effect a great deal by making the girls under her superintendence properly scour and sweep the school, dust the furniture, make and keep the fires, and clean the stoves or grates. Boys and schools thus educated will carry habits of neatness into their homes; and will, at every leisure moment, be resorting to those little labours of repairing and cleaning which make all the difference between a tidy and an untidy home, and are of far greater practical importance than they appear to carry when barely stated."

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* Minutes of 1852-3, p. 874.

PRINCIPLES OF ASTRONOMY. No. 1.

DOCTRINE OF THE SPHERE.

THOUGH the principal truths of astronomy revealed by the telescope, or disclosed by the investigations of astronomers, are generally known and taught in our schools, yet an ignorance of the principles of the science, or of the mode by which these truths are arrived at, is very prevalent; nor is it difficult to account for this defect, which springs in part from the notion that the study requires an extensive knowledge of mathematics, more time and attention than young people have at command, and instruments the expense of which is thought an effectual bar to progress in the science. Though influential to a great extent, these causes need not stand in the way of acquiring a certain amount of knowledge respecting the celestial movements, and, as I hope to show in these papers, the grandeur and beauty of the universe are still open to the intelligent inspection of those whose opportunities and appliances are limited by circumstances. I shall not waste time in stating those astronomical facts which are exhibited in every elementary treatise, but shall take up those points in which all such are deficient, and endeavour to open to the readers of this journal such a view of elementary principles as shall prepare them, should they be so disposed, to proceed on a sound basis towards the higher branches of that science which yields to none in the grandeur of its revelations and the certainty of its predictions.

The subject of this paper will be what is usually termed the "Doctrine of the Sphere," the portion which will be especially illustrated will be the diurnal movement of the celestial bodies. It must be premised that this movement is apparent, and not real: the rotation of the earth on its axis produces the phenomena of the rising, culminating, and setting of the heavenly bodies; and although in common parlance we ignore the earth's motion, and speak of the sun and stars rising and setting, yet as this form of speech is sanctioned by long usage, and is even adopted by astronomers for convenience and to avoid circumlocution, we must continue to retain it though philosophically incorrect.

The earth on which we dwell is a sphere of nearly 8000 miles in diameter, floating through space, separated by a distance of many millions of miles from her sister planets and the sun the centre of the system. At an inconceivable distance in every direction are the fixed stars, so far removed that the change of place, during the earth's annual revolution round the sun, produces no alteration in their configuration. We may indeed consider the system of which our earth is a member, to be a mere point in space; when viewed from the most proximate of those bodies, the "great globe itself and all that is within it" might dissolve, and the event would remain unknown to the inhabitants of Sirius, as is her present existence. Hence, in whatever direction the earth travels, or at whatever rate, the relative position of the stars composing the visible heavens will remain unchanged; nor will their members indicate, by altered distances, the approach or recess of the earth, though attacked by the best instrumental appliances of modern astronomy.

The place of our abode rotates majestically on its axis in space, presenting, during twenty-four hours, different portions of her surface to the sun—the source of light and heat: as his rays can only enlighten one half of the sphere at once, it will be day to that hemisphere on which the sun is shining, and night to the other. Now, if the axis of the earth were perpendicular to the plane of her orbit, the boundary of light and darkness, of day and night, would ever pass through the poles. The sun would shine vertically over the equator, and there would be no change of seasons; perpetual summer would rest on the globe, an equable temperature would reign throughout each latitude, the heat gradually decreasing as the poles were approached; day and night would be of the same length in all times and places, as they are in the planet Jupiter: why our condition is different will appear from considerations hereafter to be adduced. We cannot detach ourselves from the earth to a position where we might make observations as to the inclination of the earth's axis to the plane of her orbit; nor is this necessary, as it may be deduced from observations taken from any spot on her surface.

In the rotation of the earth, as indeed of any globe, two points are fixed; and the line joining these, when produced to the celestial concave, will be directed to two definite points in the sphere which will ever remain stationary; for the annual motion of the earth, when referred to the fixed stars, which are immeasurably distant, will be inappreciable; or, in other words, the space included within the orbit described by the earth in her annual revolution, when viewed from the distance of those bodies, will dwindle down to a point—in short, the circumstances will be such as they would be if she remained stationary. Hence the points over the poles of the earth will ever retain the same position in the heavens, provided the inclination of the axis of the earth to her orbit remains unchanged. Such is found by observation to be the case; and to ascertain this fixed point is the first desideratum in practical astronomy.

On a fine starry night, facing the north, watch attentively the motion of the heavens. You will observe stars, not before visible, will constantly rise in the east; while others will set in the west: as you carry your eye from the east towards the north, you will find certain stars which do not sink below the horizon at all. If from the northern point of the horizon you advance your view upward, you will find that the stars, as they approach a certain point somewhat more than half way between the horizon and the zenith, move more and more slowly, until you arrive at one which you will not perceive to move at all—this is the pole star, and it is so nearly over the pole, that for ordinary purposes it may be considered to represent the stationary point, or the northern celestial pole. Round this all the stars visible will be found to revolve. Now this stationary point appears fixed in the same position all the year round; hence we conclude that the earth's axis of rotation never changes its inclination to the orbit, but is always parallel in one position to the direction in which it pointed in another: the same may be remarked in the southern hemisphere, where the point in the heavens reached by the prolongation of the earth's axis is in like manner definitely and perpetually fixed.

Assistance may be derived for ascertaining the position of the pole star by tracing it through the aid of the Great Bear. This constellation, which never sets in our latitude, has seven stars of considerable brilliancy; four of these compose a trapezium, and the other three branch out from one of the angles: if the line joining the two stars most remote from these three be continued about five times their distance, it will pass very near the pole star; which cannot be mistaken, inasmuch as there is no star approaching it in brilliancy in its neighbourhood.

The direction of the axis of the heavens then will be a line passing from the northern celestial pole through the earth's centre towards the southern, which will be invisible in northern latitudes. Now, since the earth diminishes to a point when referred to the fixed stars, no incorrectness in our reasoning will be introduced from the fact, that our position is not at the centre but on the circumference; in other words, suppose a telescope fixed in the direction of the northern celestial pole, the axis of that telescope will be parallel to the axis of the earth, and will coincide with the axis of the heavens; for, although it is distant from the earth's centre by 4000 miles, such is the distance of the fixed stars that this space viewed from them would be as though it existed not.

Round this axis then all the heavenly bodies appear to turn from east to west, a complete revolution being accomplished in twenty-four hours—a result this of the rotation of the earth from west to east. Those situated near the celestial poles describe circles which increase in size according to their distance from either: at what part of the heavens will be found the greatest of these diurnal arcs? Most certainly it will be described by those stars which are equidistant from either pole: such stars will describe in the heavens the *equinoctial line* whose position will be exactly over the equator on the earth: its plane being at right angles to the axis, and its distance, in angular measurement, 90° from either pole.

We have thus determined the position of one of the principal circles of the sphere; it would be well to trace the progress of a few stars which are on or near the equator in order to form a correct notion of its exact position in the heavens; and although we have hitherto supposed, on the part of the observer, an absence of all knowledge of the constellations (to which however we shall hereafter direct his attention), we may mention here, for future reference, certain stars which are situated near the equinoctial line. Menkar in Cetus is a bright star, 3° north of the equator, α Aquarii is on it, so are η Libræ, and θ Aquilæ; this last is in a line with α, β, and γ Aquilæ, which are three conspicuous stars, α being of the second magnitude, and β and γ of the third; δ Orionis, the most northern of the three in Orion's belt, is also on the equator; the diurnal arc described by either of these stars will trace out in the heavens the equinoctial line, whose situation should be perfectly comprehended before we proceed further.

On the supposition that the student has been so far successful, we advance to the consideration of the other circles of the sphere, commencing with the *horizon*. If you are stationed on an open plain, where nothing obstructs your view on any side; or rather on the ocean, where the prospect is limited only by the junction of the sea with the heavens, you will find yourself to be the centre of a circle, of which the union of the sea and sky is the circumference: the plane of this circle is the horizon; and if it be imagined indefinitely produced it will meet the celestial sphere, and will divide it into two equal portions. The heavenly bodies in the upper division will be visible, while those beneath will be unseen. The plane of the horizon will, in other words, be a tangent to the curved surface of the sea passing through the position of the spectator. This definition is that of the *sensible horizon*; the *rational horizon* is another plane parallel to the former, passing through the centre of the earth at the distance of 4000 miles; but, following the process of reasoning used antecedently, this distance will vanish when referred to the fixed stars; and hence, when observations are taken on these bodies, the two planes may be considered coincident. In the case of the sun, however, this space of 4000 miles—the earth's semi-diameter—would subtend a small angle of 9″; at the distance of the moon a much greater angle, amounting, when she is nearest to the earth, to more than one degree, by which amount she would be displaced; or her true position would differ by one degree from her observed, when she is on the horizon of any place. These remarks are thrown out as suggestive, and not because they are necessary at the present stage of our explanation of the doctrine of the sphere.

The horizon then divides the heavens into two equal hemispheres—the visible and invisible: the point immediately over the head of the observer is the *zenith;* a line drawn from the zenith to the place of the observer will be perpendicular to the plane of the horizon; and the zenith itself will be 90° distant every way from the horizon measured on the arc of a vertical circle, or one drawn from that point to the horizon. Now here we see a correlation between this vertical line, the zenith and horizon, corresponding to that before explained between the axis, the pole and the equator: in the language of spherical trigonometry, the zenith is the pole of the horizon, or that point in the sphere which is exactly 90° from it in whatever direction it is measured. If these important truths are fully comprehended, no difficulty will be found in tracing the other circles which will hereafter come under our notice.

Since all the heavenly bodies rise and set, a moment's consideration will lead to the conclusion that there must be in the path of any star a point in which it ceases to ascend above the horizon and begins its downward course. Let it be granted, that by carefully watching any particular star, you have determined the point of its greatest altitude; imagine an arc, or part of a circle, to pass from the zenith through this point, cutting the horizon; it will be found also, when continued, to pass through the pole: a succession of observations on separate stars will clearly indicate that each and all will *culminate,* or attain their greatest altitude, when they arrive at this circle: the moon, the planets, and the sun, will also, when they reach this circle, begin to decline in their course. The period when the sun arrives here is mid-day, or noon; from the Latin *meridies* is derived the name which designates this circle, viz., *the meridian:* it may be defined as a circle which bisects the horizon in two points, passing through the zenith and the pole; by its means we may determine astronomically the north and south points of the horizon, which problem is so necessary in every astronomical observation, that we shall bestow some time in showing how this may be done with very considerable precision, even by an observer unprovided with expensive instruments, which some may think absolutely necessary in acquiring a knowledge of astronomical truths.

On a perfectly level surface erect a stick in the ground, taking care, by applying a plumb-line, that it be exactly perpendicular; about nine o'clock in the morning observe the length of its shadow as thrown by the sun: with the stick as a centre, and this length as a radius, describe an arc from west to east. After the sun has passed the meridian, about 3 P.M., the shadow of the stick will be observed to fall upon the arc—in fact, it will be of the same length as it was in the forenoon: if that portion of the arc intercepted between the two points where the shadow reached it be bisected, and a line be drawn from the point of bisection to the end of the stick which is fixed in the ground, this line will be due north and south, or in the direction of the meridian. It will be immediately seen that the result depends upon the fact, that the altitude of the sun is the same at an equal period before noon as after; though, strictly speaking, it is not; seeing that the sun, during the interval, changes his distance from the equator:

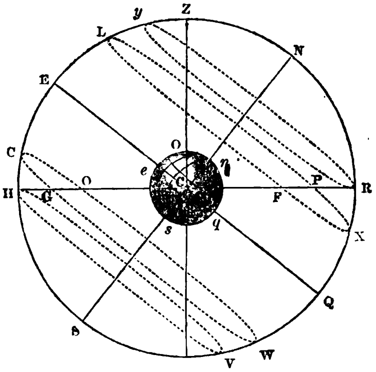
this change is greater at certain periods of the year than at others—least when he has attained his greatest distance, and hence the best time for an accurate performance of this problem will be about June 21, when the sun is at his furthest northern departure from the equinoctial line.

The attention of the student is recalled to the facts which we have now proved: 1st. the meridian is a circle passing through the zenith and the pole, cutting the horizon in the north and south points; 2nd. the distance from the zenith to the northern part of the horizon is 90°; 3rd. the distance of the pole from the equator is 90°, or equal to that of the zenith from the horizon: from the pole to the zenith these two arcs, measured on the meridian, will overlap, if this common portion of the equal arcs be abstracted from each, there will remain the distance of the pole from the horizon equal to the distance of the zenith from the equinoctial line measured in degrees: but the zenith is vertical to the observer and the equinoctial line is vertical to the equator of the earth: the distance in degrees of the observer from the equator is his latitude; and hence it follows that the elevation of the pole, measured in degrees, will always equal the latitude of the place. Remark the great importance of being fully persuaded of this fact by irrefragable proof, and proceed no further with this paper till the mind has mastered the demonstration: no other fact is more frequently assumed in reasoning on the sphere, and many of the problems are easily solved when this truth is granted.

The progress we have made will receive valuable illustration by a very simple mechanical contrivance. Cut out, of any convenient size, several circular disks of card-board. By cutting each from the centre to the circumference they may be made to slip one upon the other. Suppose one to represent the horizon of the place which is situated at its centre; another at right angles to it will be in the plane of the meridian: find on the edge of this the position of the pole, which will be equal in degrees to the latitude of the place—say, as in the case of London, 51½°: measure 90° from it and that will be the place where the equator cuts the meridian—it may be represented by another disk of card concentric with the other two: if these be so placed, of a starry night, that the disk representing the horizon be level, the position of every circle or point hitherto described will be ascertained with precision, and every fact stated in this paper will be successfully demonstrated.

The most available and suitable instrument for illustrating the doctrine of the sphere is the celestial globe, and as at the present time globes may be procured, certainly of small size, for a few shillings, it would be advisable for any student to provide himself with this beautiful means of illustrating the celestial movements. A few preliminary explanations may be necessary in order to connect its explanation with the principles already adduced and demonstrated. The celestial globe professes to be a representation of the face of the heavens; on it are depicted the various constellations, and on it are traced the circles which have been described in the preceding pages. The reason why the celestial globe does not correctly represent the celestial sphere, is that these circles are described and the configurations depicted on a convex sphere; whereas naturally they are presented to us on a concave or hollow sphere: the error is exactly the reverse of that committed in the construction of the terrestrial globe in Leicester Square, which turns the wrong side outermost: convenience of usage compels us to submit to the inconvenience in the former case, but we shall never cease to regret that so much labour was bestowed upon a representation of our earth which is wrong in principle and repulsive of aspect. To understand in what way the celestial globe represents the sphere, we are compelled to imagine the eye at the centre, and then, if the globe were duly rectified, we should see each star over its depicted place: to get over this difficulty some opticians have constructed the globe of glass, and have placed within it a small terrestrial globe, on which the observer is supposed to be fixed; as the axes of the two are identical the small globe is made to turn round, thereby representing the diurnal motion of the earth, which is the cause of the celestial movements, in twenty-four hours: to get rid of one difficulty however they have introduced another, for as the observer is not supposed to be at the centre of the sphere, but on the surface of the small globe, and as the glass sphere is very near to it, the semi-diameter of the small globe does not, as it should, diminish to a point, and hence the sensible and rational horizons do not coincide as they do in nature when referred to the fixed stars. No confusion will attend the use of the celestial globe if it be borne in mind that, when we turn it from east to west, we represent not a real motion of the heavens but an apparent motion, caused by the revolution of the earth in an opposite direction from west to east.

It remains now to show how the facts brought forward in this paper may be graphically illustrated: for this purpose we refer to the figure, which may be considered as a sectional view of the glass globe above alluded to, with the small terrestria globe within, their two centres being coincident.



H R will be the plane of the rational horizon (seen edgewise) of an observer at O: in this projection there is precisely the defect before alluded to, which must be got over by supposing either that the globe is indefinitely diminished in size, or that the circle H Z N R, which represents the meridian, is indefinitely enlarged, as indeed it would be when referred to the fixed stars; *n s* is the axis of the earth; its prolongation, N S, the axis of the heavens. Z, the point immediately over the observer at O, is the zenith; N and S, the north and south poles; *e q* is the equator; E Q the equinoctial; the dotted lines are diurnal arcs of heavenly bodies at different distances from the poles; these vary in size, the greatest being described by those equidistant from both, which are situated on the circle (seen edgewise) E Q; O *e* is the latitude of the place, which arc, on the circumference of the earth, measures the angle O C *e*, which is the same as the angle Z C E: that this is equal to the elevation of the pole, viz. the angle Z C N, may be thus shown: N C E is equal to Z C R, both being right angles, but the part Z C N is common to both—this being deducted, Z C E is equal to N C R.

The graphical method of indicating the circles of the sphere is attended with many advantages, but it should not be resorted to till an acquaintance is made with them in the heavens: it supplies us, when once it is apprehended, with an elegant and simple method of explanation of various phenomena, and of solving complicated problems. The circle which is, so to speak, the ground-work of the projection (in this instance H N Q), is called the primitive circle; and the figure would properly be called "the projection of the sphere on the meridian;" in the figure, the angle N C R being equal to 51½ degrees, the meridian is that of London, or of any place having the same latitude. Had the primitive circle been the horizon, Z the zenith would have been the centre, and the meridian would have been represented by a straight line.

If a machine be constructed of thin hoops, with a small globe in the centre, whose axis, being prolonged to the meridian, serves as the centre of motion for the whole, we shall have an *armillary sphere;* a very useful and easily constructed apparatus: we have only to be careful to place the hoop representing the meridian at right angles to the representative of the horizon; the equator at right angles to the axis; another circle, partially indicated by Z C, will be the prime vertical; another passing through the poles, seen in the drawing as the line N S, will be the equinoctial colure, which will cut the prime vertical at the east and west points.

As it is of great moment that the principles explained should be well impressed on the mind, various methods of illustration have been resorted to in this paper; for as minds differ, so is it necessary to present philosophical truth in various aspects, and it is hoped that, from one or the other, it may be fully and clearly comprehended by all. No portion of astronomy is so satisfactory to the mind as this which forms the subject of the present lesson. Many who gaze at the planets and the moon through powerful telescopes would be at a loss to explain "the doctrine of the sphere," and yet, ignorant of it and all its results, they cannot lay claim to a knowledge of the science of astronomy: they may appropriate and use the labours of others, and obtain a fictitious reputation, but only among those whose opinion would be of no weight with scientific observers. J. D.

Notices of Books.

GLEIG'S SCHOOL SERIES. ELEMENTS OF BOOK-KEEPING. A HISTORY OF FRANCE. BY A. K. ISBISTER. (London: *Longmans & Co.*)

THE History of France, at some periods, is minutely interwoven with that of our own country, and the study of it puts us in possession of more comprehensive views regarding our own: it therefore deserves to be regarded in our own school studies. The little book before us presents a very fair synopsis of historical facts, from the fifth century to the present time. The Gallic period, which is not uninteresting to a young Briton, has been passed over unnoticed. The Merovingian and Carlovingian dynasties are also summarily dealt with. The History of France becomes less involved from the time that Hugh Capet ascended the throne, A.D. 987; and it is from that date that the account takes a more regular form, although necessarily a naked narrative of facts. The book will be of service as a text-book to read in class, collateral matter being supplied by the teacher.

The compiler of the Book-keeping for this series complains "that a satisfactory knowledge of the subject is seldom attained at school;" and then, as a plea for having undertaken this compilation, "apprehends that the fault lies quite as much with the inadequacy of the common text-books as with those who are set to study them." If boys remain a sufficient time at school to be fitted for acquiring a knowledge of the subject they will generally do so, with proper aid, from one of the dozen books now in common use. The mistake, where it occurs, generally lies with the director of the pupil's studies. Book-keeping, so far as learning it is concerned, consists in the acquisition of certain technical forms, supplementary to a thorough knowledge of the principles and practice of arithmetic and an adequate command of the pen. This little introduction has a very good quality which must not be overlooked, and which is not common to all of the same series: it is the cheapest we have on the subject, except that on the list of "Irish Books," which is certainly very inferior to this in point of merit.

THE CHURCH PSALTER; BEING A COLLECTION OF PSALMS OF THE NEW VERSION, SET TO APPROPRIATE TUNES, TAKEN CHIEFLY FROM THE OLD PSALTERS, ARRANGED FOR FOUR VOICES, BY T. AND F. E. CRAMPTON. (London: *Rivingtons.*)

THIS unpretending little book is very fairly described in its title. It is an attempt on the part of two elementary schoolmasters to promote the diffusion of ancient Psalmody. The tunes are, therefore, either old ones or imitations, and for the most part those which are written in *common time.* The great characteristic of the collection is its simplicity; and this applies not only to the tunes selected, but to the arrangement of the parts, the fundamental chords being those principally employed in the harmonies. There is with some people a tendency to adapt popular and secular airs to the services of religion; we consider this very objectionable; for airs of this kind invariably carry with them the impression which they first conveyed. This is true, also, of phrases and strains. The tunes in this collection are free from all objections of this kind.

THE CHILD'S TREASURE; OR, READING WITHOUT SPELLING, EFFECTUALLY SIMPLIFIED BY A NOVEL SYSTEM; WHICH IS EQUALLY AVAILABLE IN THE PRESENT MODE OF TEACHING TO READ; AND IN WHICH ARE SEPARATELY TAUGHT, 1. THE LONG SOUNDS OF THE VOWELS; 2. THEIR SHORT SOUNDS; 3. THEIR OTHER SOUNDS, &c. &c. BY H. J. (London: *Law.*)

THE perusal of this book affords another instance of the fact, that it is much easier to plan than to carry into operation. The Child's Treasure is nothing more nor less than a very slight modification of the common spelling-books, in which we have alternately spelling and anecdote, fable and tale. In the book before us, in place of these we have a series of unconnected, flimsy sentences, strung together with the object of illustrating, according to the compiler's notion, the various sounds of the several vowels in their order. We are told, that in pursuance of this object, "it has been so arranged, that in the first 33 pages of this little book the mind and ear are not bewildered by the introduction of any *other* than the long or alphabetic sounds of the vowels marked 1 in Walker's Table." Yet we find every page up to this point abounds with exceptions. For example, "Do not refuse to write me a note." Are we to give the same long sound to the letter *o* in the first three instances of its occurrence in this sentence as in the last *note?* Has the *a* the long sound here? Must the *e* in *refuse* be long like that in *me?* "Reading without Spelling," too, is a specious title and very attractive to indulgent parents and teachers who would spare themselves trouble. The spelling, however, must in both cases be performed, in the one it is articulated, in the other it is done mentally.

A COMPLETE SYSTEM OF ARITHMETIC, THEORETICAL AND PRACTICAL; ADAPTED TO THE USE OF SCHOOLS AND PRIVATE STUDENTS, &C. BY JAMES TROTTER. (Edinburgh: *Oliver & Boyd.* London: *Simpkin & Co.*)

THIS is a comprehensive work, containing the fundamental rules, and their application to mercantile computations, vulgar and decimal fractions, involution and evolution series, certain and contingent annuities. Mr. Trotter is well known amongst teachers as an author to whom they are much indebted; but we must say that his book contains no sufficient peculiarity or excellence to cause it to supersede similar works.

A CHILD'S HISTORY OF THE WORLD; OR, GLIMPSES OF THE WORLD'S HISTORY IN FAMILIAR LETTERS. WRITTEN FOR THE INSTRUCTION AND AMUSEMENT OF A CHILD. BY MRS. PERCY SINNETT. (London: *Longman & Co.* 1853.)

THE writer of this interesting little work has very successfully carried out her design. She has made a most useful addition to our juvenile books. The writer shows great aptness in simplifying Ancient History, and we know of no previous account which would so well come within the apprehension of a child. The History ranges from the time of Abraham to the discovery of America, or to about the end of the fifteenth century, and may be looked upon as the first part of a work to be continued in a similar style.

EDMUND BURKE: BEING FIRST PRINCIPLES, SELECTED FROM HIS WRITINGS. WITH AN INTRODUCTORY ESSAY. BY ROBERT MONTGOMERY, M.A. Pp. 416. (London: *G. Routledge,* 1853.)

WE are desirous of calling attention to this volume, as one which we would strongly recommend to those who consider that one grand object of the education of English youth should be, to teach them to prize the good which has fallen to their lot in numbering some of the most illustrious of earthly names amongst their ancestors, and in claiming a share, by virtue of their birthright, in a countless store of spiritual wealth; and, in order to this end, to train them to love and venerate the wise and good of former generations, and to grow up in communion of thought, and feeling, and principle with them. Of this noble company was Edmund Burke, and we may safely say of the selections from his writings, what in our last number we quoted Hallam as saying of Bacon's Essays, that very few in our language afford more nourishment to the thoughts. As the selector observes, in his introductory essay, Burke's peculiar gift and the great distinction of his oratory was his intuitive perception of universal principles; his amazing power of expanding particulars into universals, and of associating the accidents of a transient discussion with the essential properties of some permanent law in policy, or abstract truth in morals. And beyond what his distinctive genius inspired, his wonderful power of enunciating everlasting principles, and of associating the loftiest abstractions of wisdom with the commonest themes of the hour, was sustained and strengthened by the purity of his heart, and the subjection of passion to the law of conscience. His works extend through many volumes, and hence it is to be feared that many have been deterred from holding communion with a master-spirit of British literature by the magnitude of his labours. Mr. Montgomery entertains the hope that a concentrated specimen of Burke's intellect may not only tempt the "reading public" to study some of his noblest passages, but even ultimately introduce them into a full acquaintance with his entire productions. The selection before us is distinctly stated to be, not a second-hand one, grafted on any pre-existing volume, but the result of a diligent, careful, and analytical perusal of Burke's writings. The selection is judicious, and the attempt to give descriptive headings to the selected passages will prove, we have no doubt, of considerable service to the reader; but we can quite believe that they have cost the selector no slight labour. They are also turned to account as the basis of an alphabetical index. We wish that there had been also a list of contents, giving the descriptive headings in the order in which they are printed in the volume, as neither in the introductory essay nor in the passages as selected is any principle of arrangement, as far as we can make out, observable. Mr. Montgomery would also, we think, have rendered his selection more likely to introduce its readers to an acquaintance with the entire productions of his author, if the quotations had been so arranged or distinguished as to show from what sources they are taken. The introductory essay contains very just remarks, some of which we have quoted; but we should have liked it better if the style had been more simple and unpretending.

CHAMBERS'S REPOSITORY OF INSTRUCTIVE AND AMUSING TRACTS. VOL. VI.

CHAMBERS'S POCKET MISCELLANY. VOL. XXII. 1853.

CHAMBERS'S EDINBURGH JOURNAL. PART CXVII. SEPTEMBER, 1853.

We need scarcely remind our readers of these well-known publications; our principal motive for doing so is, that in the case of Reading Rooms and Lending Libraries, the regular publication of these serials at short intervals is of considerable service, as furnishing a cheap and constant supply of fresh works, which are interesting from generally having some reference to the passing events of the day, and which may be safely introduced without previous examination, from the good character which their conductors have established. In proof of this, we would refer to such articles in the "Repository" as "Irish Tours and Tourists in 1853;" "The Search for Sir John Franklin;" "Montenegro and the Montenegrins:" to "Visit to the Sailors' Home in London," in the "Pocket Miscellany:" and to "Employments of Women;" "The Rebellion in China;" "Scenes at Portsmouth;" and "The Railway Clearing-house in 1853;" in the September number of the new series of "Chambers's Edinburgh Journal."

POETICAL SCRIPTURE HISTORY. BY THE REV. H. S. M. HUBERT, M.A. Pp. 178. (London: *Longmans.*)

THE design of this little work is to afford a pleasing means of conveying Scriptural instruction to the youthful mind, and of preserving the young from regarding Scripture history as a mere historical record of the sayings and doings of the men of old time. The sacred narratives should never be treated as histories merely, but as far as possible in relation to the close connection which they have to the work of our redemption. This connection has been shown by some of our sacred poets, and especially by Milton, with great clearness, and in language both sublime and beautiful. Accordingly, in the publication before us, some of the principal events recorded in Scripture are illustrated by passages of poetry, principally from Milton. It is very justly remarked in the preface, that Milton has by no means had that share in the education of the youth of this country to which, from the excellent moral and religious tendency of his poetry, he is justly entitled. As one not improbable reason of this it is alleged, that no selection of his poetry has hitherto appeared, from which the purely imaginative scenes created by his genius have been excluded, and which has, at the same time, illustrated some definite subject. In the present selection, those portions of his poetry which are so highly imaginative as to transgress the bounds of probability are not introduced. The selection being made with the view of illustrating the principal facts of sacred history, it is obvious that such passages would not be suitable. These facts are arranged in chronological order, with references to the Bible, and short connecting observations in prose, under which the selected passages are introduced. We could almost wish that no other facts had been illustrated than those for which Milton would furnish appropriate passages. Even such poets as Cowper and Heber do not satisfy us, when they are quoted side by side with Milton. Beautiful, too, as are doubtless some of the Hebrew melodies, there is nevertheless something in their tone and metre which seems to us not in accordance with the poetry of him, whose purpose was (to use the words of Johnson) "to vindicate the ways of God to man; so show the reasonableness of religion, and the necessity of obedience to the Divine law." Whilst we thankfully acknowledge the service which the author or compiler of this little work has rendered in suggesting and providing such a means of conveying Scriptural instruction, we trust he will not take it amiss, if we recommend him, in his proposed "Poetical English History" on a plan similar to the above, to confine his illustrations to passages from our best English classics.

ADDITIONS TO QUESTION 180.

By Mr. W. H. Levy, of Shalbourne.

By trigonometry we have the following relations,

$$AO^2 = \frac{r^2}{\sin^2\frac{1}{2}A},\quad BO^2 = \frac{r^2}{\sin^2\frac{1}{2}B},\quad CO^2 = \frac{r^2}{\sin^2\frac{1}{2}C}$$

$$AO_1^2 = \frac{r_1^2}{\sin^2\frac{1}{2}A},\quad BO_1^2 = \frac{r_1^2}{\cos^2\frac{1}{2}B},\quad CO_1^2 = \frac{r_1^2}{\cos^2\frac{1}{2}C}$$

$$AO_2^2 = \frac{r_2^2}{\cos^2\frac{1}{2}A},\quad BO_2^2 = \frac{r_2^2}{\sin^2\frac{1}{2}B},\quad CO_2^2 = \frac{r_2^2}{\cos^2\frac{1}{2}C}$$

$$AO_3^2 = \frac{r_3^2}{\cos^2\frac{1}{2}A},\quad BO_3^2 = \frac{r_3^2}{\cos^2\frac{1}{2}B},\quad CO_3^2 = \frac{r_3^2}{\sin^2\frac{1}{2}C}$$

Substituting for r, r_1, r_2, r_3, and the trigonometrical functions, their values in terms of a, b, c, we obtain

$$\frac{AO^2}{bc} = \frac{s-a}{s},\quad \frac{BO^2}{ac} = \frac{s-b}{s},\quad \frac{CO^2}{ab} = \frac{s-c}{s}$$

$$\frac{AO_1^2}{bc} = \frac{s}{s-a},\quad \frac{BO_1^2}{ac} = \frac{s-c}{s-a},\quad \frac{CO_1^2}{ab} = \frac{s-b}{s-a}$$

$$\frac{AO_2^2}{bc} = \frac{s-c}{s-b},\quad \frac{BO_2^2}{ac} = \frac{s}{s-b},\quad \frac{CO_2^2}{ab} = \frac{s-a}{s-b}$$

$$\frac{AO_3^2}{bc} = \frac{s-b}{s-c},\quad \frac{BO_3^2}{ac} = \frac{s-a}{s-c},\quad \frac{CO_3^2}{ab} = \frac{s}{s-c}$$

From these and their reciprocals we get the following six properties:—

$$\frac{AO_1^2}{bc} - \frac{BO_1^2}{ac} - \frac{CO_1^2}{ab} = 1 \qquad \frac{bc}{AO^2} - \frac{ac}{BO_3^2} - \frac{ab}{CO_2^2} = 1$$

$$\frac{BO_2^2}{ac} - \frac{CO_2^2}{ab} - \frac{AO_2^2}{bc} = 1 \qquad \frac{ac}{BO^2} - \frac{ab}{CO_1^2} - \frac{bc}{AO_3^2} = 1$$

$$\frac{CO_3^2}{ab} - \frac{AO_3^2}{bc} - \frac{BO_3^2}{ac} = 1 \qquad \frac{ab}{CO^2} - \frac{bc}{AO_2^2} - \frac{ac}{BO_1^2} = 1$$

ANSWERS TO THE MATHEMATICAL QUESTIONS.

QUES. 191.—*Proposed by Amicus.*

$$\left.\begin{aligned} \text{Given } x + \frac{x^2}{y} + y &= 19 \\ \text{and } x^2 + \frac{x^4}{y^2} + y^2 &= 133 \end{aligned}\right\}\text{to find } x \text{ and } y.$$

First Solution, by Mr. J. Godward and Mr. J. Lovell.

Clearing the two equations of fractions, we have

$x^2 + xy + y^2 = 19y \ldots (1)$, and $x^4 + x^2y^2 + y^4 = 133y^2 \ldots (2)$

Dividing (2) by (1), $x^2 - xy + y^2 = 7y \ldots (3)$

Subtracting (3) from (1), $2xy = 12y$; $\therefore x = 6$.

Substituting this value for x either in (1) or (3), we have $y^2 - 13y = -36$; which solved gives $y = 4$ or 9; so that either $x = 6$ and $y = 4$, or $x = 6$ and $y = 9$ will satisfy the two equations.

Second Solution, by Mr. Levy and Z.

Squaring the 1st, eq. $x^2 + \frac{x^4}{y^2} + y^2 + 2x\left(x + \frac{x^2}{y} + y\right) = 361$

Subtracting the 2nd, $2x\left(x + \frac{x^2}{y} + y\right) = 228$

Dividing this by the 1st, $2x = 12$ or $x = 6$.

Substituting this for x in the 1st equation, we get $y^2 - 13y = -36$, which gives $y = 4$ or 9.

QUES. 192.—*From the Senate House Problems for* 1843.

If $y = e^{\frac{1}{1-\log x}}$, and $z = e^{\frac{1}{1-\log y}}$, prove that $x = e^{\frac{1}{1-\log z}}$

Solution, by A. M., A. G. P., and Mr. Rutter.

From the 1st condition $\log y = \frac{1}{1 - \log x}$, and from the 2nd $\log z = \frac{1}{1 - \log y}$

Eliminating $\log y$, we have $\log z = \frac{\log x - 1}{\log x} = 1 - \frac{1}{\log x}$;

hence $\log x = \frac{1}{1 - \log z}$, and $\therefore\ x = e^{\frac{1}{1-\log z}}$.

QUES. 193.—*Proposed by Mr. Wm. Godward.*

Let A B C be a triangle right-angled at C, such that A B = 2 B C, and let a point D be taken in A B, such that B C + B D = A C; then if D E be drawn at right angles to A B meeting A C in E, it is required to prove that B D = D E.

First Solution, by Amicus and Mr. W. Godward, jun.

By the conditions of the question $AD = AB - BD = 2BC - (AC - BC) = 3BC - AC$, and by sim. tri. $DE = AD.\frac{BC}{AC} = \frac{BC}{AC}(3BC - AC) = \frac{3BC^2}{AC} - BC = \frac{AB^2 - BC^2}{AC} - BC = AC - BC = BD$

Second Solution, by E'., A. G. P., and Mr. J. Godward.

Let $BC = a$, then $AB = 2a$, and $AC = a\sqrt{3}$; hence $BD = AC - BC = a(\sqrt{3} - 1)$, and $AD = AB - BD = a(3 - \sqrt{3})$; therefore by sim. tri. $DE = AD.\frac{BC}{AC} = a(\sqrt{3} - 1) = BD$.

QUES. 194.—*Proposed by Mr. W. H. Levy.*

From a given paraboloid, whose axis is a, the greatest cylinder is cut out, and from the remaining upper part, the greatest cylinder is also cut out, &c. *ad infinitum*. It is required to prove that the distance of the centre of gravity of the remaining solid from the centre of the base of the paraboloid is $= \frac{2}{7}a$.

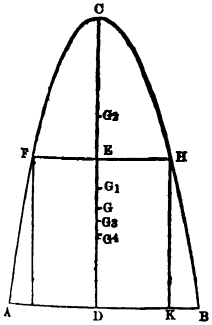
First Solution, by Amicus and E′.

Let P be the volume of the paraboloid, $c_1, c_2, c_3 \ldots$ the volumes of the successive maximum cylinders, $g_1, g_2, g_3 \ldots$ the altitudes of their centres of gravity above the centre of the base of the paraboloid, G the altitude of the centre of gravity of paraboloid, G_1 that of the sum of the maximum inscribed cylinders to *infinity*, and G_2 that of the remaining solid. Then by quest. 161, the heights of $c_1, c_2, c_3 \ldots$ are $\frac{a}{2}, \frac{a}{4}, \frac{a}{8} \ldots$; therefore $g_1 = \frac{a}{4}, g_2 = \frac{a}{2} + \frac{a}{8} = \frac{5a}{8}, g_3 = \frac{3a}{4} + \frac{a}{16} = \frac{13a}{16} \ldots$; also by quest. 185 $c_2 = \frac{c_1}{4}, c_3 = \frac{c_2}{4} = \frac{c_1}{16} \ldots$, and $c_1 + c_2 + c_3 = \frac{4c}{3}$ or $\frac{2}{3}$P.

Hence $c_1 g_1 + c_2 g_2 + c_3 g_3 \ldots = a c_1 (\frac{1}{4} + \frac{5}{32} + \frac{13}{256} \ldots) = a c_1 \left(\frac{4-3}{4} + \frac{8-3}{32} + \frac{16-3}{256} \ldots\right) = a c_1 (1 + \frac{1}{4} + \frac{1}{16} \ldots) - 3 a c_1 (\frac{1}{4} + \frac{1}{32} + \frac{1}{256} \ldots) = (\frac{4}{3} - \frac{6}{7}) a c_1 = \frac{10}{21} a c_1$.

$\therefore G_1 = \frac{c_1 g_1 + c_2 g_2 + c_3 g_3 \ldots}{c_1 + c_2 + c_3 \ldots} = \frac{5a}{14}$, and $G_2 = \frac{G \cdot P - \frac{2}{3} P \cdot G_1}{\frac{1}{3} P} = 3G - 2G_1 = a - \frac{5}{7} a = \frac{2}{7} a$.

Second Solution, by Mr. W. Godward, jun., and Mr. W. H. Levy.



Let P be the volume of the paraboloid, of which A C B is a section passing through the axis C D. Then by quest. 161, the altitude D E of the greatest cylinder F K, which can be inscribed therein $= \frac{1}{2}$ D C; also by quest. 185, the volume of the cylinder itself $= \frac{1}{2}$ P, and the sum of the volumes of the maximum cylinders $= \frac{2}{3}$ P; hence the volume of the remaining solid $= \frac{1}{3}$ P.

Again, let G be the centre of gravity of the paraboloid, G_1 that of all the maximum cylinders to infinity inscribed therein, G_2 that of all of them *minus* the first cylinder F K (which will be the maximum cylinders inscribed in F C H), G_3 that of the remaining solid, and G_4 that of the cylinder F K. Hence by similar figures $DC : EC :: DG_1 : EG_2$; but $EC = \frac{1}{2} DC$, therefore $EG_2 = \frac{1}{2} DG_1$, and $DG_2 = \frac{1}{2}(DC + DG_1)$; also $DG = \frac{1}{3} DC$, and $DG_4 = \frac{1}{2} DE = \frac{1}{4} DC$. Now taking the moments from D, we have

$\frac{2}{3}P . DG_1 = \frac{1}{2}P . DG_4 + (\frac{2}{3}P - \frac{1}{2}P) . DG_2 \ldots (1)$, and $P . DG = \frac{2}{3}P . DG_1 + \frac{1}{3}P . DG_3 \ldots (2)$.

From (1) we have $4\, DG_1 = 3 . DG_4 + DG_2 = \frac{3}{4} DC + \frac{1}{2}(DC + DG_1)$, which gives $DG_1 = \frac{5}{14} DC$; and from (2) $DG_3 = 3\, DG - 2\, DG_1 = \frac{2}{7} DC = \frac{2}{7} a$.

LIST OF MATHEMATICAL ANSWERS.

Amicus, ans. 191, 192, 193, 194; S. Dyer, Leytonstone, ans. 191; E′, Great Stukeley, ans. 191, 192, 193, 194; G. T. F., Little Bedwyn, ans. 191; J. Godward, Chelsea, ans. 191, 192, 193; W. Godward, jun., Nautical Almanac Office, ans. 191, 192, 193, 194; W. H. Levy, Shalbourne, ans. 191, 193, 194; J. Lovell, Chatteris, ans. 191; A. M., ans. 191, 192, 193; A. G. P., Herts, ans, 191, 192, 193, 194; E. Rutter, Sunderland, ans. 191, 192, 193; and Z., Leeds, ans. 191, 192.

NEW QUESTIONS,

To be answered in our Number for December, 1853.

Ques. 195.—*Proposed by Mr. John Thompson.*

Given $x^4 + 5 - 2\sqrt{x^2 - 2} = 5x^2$, to find x.

QUES. 196.—*Proposed by Amicus.*

On Maundy Thursday it is the custom to give each of as many old men the same number of pence as there are years in the sovereign's age; since her majesty's accession 16 Easters have passed away, and the sum of £44 15*s.* 4*d.* has been thus distributed; determine the Queen's age last Easter (1853).

QUES. 197.—*Proposed by A. G. P., Herts.*

Show that the times of a planet's describing the two halves of its elliptic orbit, founded by the extremities of its axis minor, are in the ratio of $\pi + 2e$ to $\pi - 2e$; where e is the excentricity.

QUES. 198.—*Proposed by Mr. T. T. Wilkinson.*

In the triangle A B C let a, b, c, be the points where the perpendiculars meet the sides; a', b', e', the middle points of the sides; and a'', b'', c'', the middle points of the lines joining the angles of the triangle to the point of intersection of the perpendiculars: then the nine points $a, b, c, a', b', c', a'', b'', c''$, lie on the circumference of the same circle.

⁂ It is particularly requested that all mathematical contributions be forwarded, at *latest*, by the 20th of each month.

TRADE SCHOOLS.

THE Rev. Henry Moseley, M.A., F.R.S., Canon of Bristol, and one of her Majesty's Inspectors of Schools, has just addressed a letter to the Committee of the Bristol Diocesan Society, on the best means of giving efficiency to the Bristol Diocesan School, in which the following passages occur:—

"The school having been established for the benefit of education generally in Bristol, it occurs to me that—under circumstances which appear in some measure to have superseded its use as an ordinary elementary school, of the same description as the parochial schools which surround it,—it would be expedient to offer in it a course of instruction of a different kind from the instruction given in those schools, and to make it supplementary to them. What I propose will perhaps better be understood if I remind you of the fact, that in ordinary national schools there are commonly some boys in advance of the rest, and capable of receiving instruction of a higher kind, which could not be given to them without occupying more of the time of the master than is compatible with the general routine of the school, and probably with the objects of the promoters. It would, I think, be a useful function of the Diocesan schools to offer to this class of boys, in a separate school, a special course of instruction of a practical kind, having reference to the mechanical and manufacturing callings and the trade of Bristol.

"The attention of the public has been directed (as the Committee will probably remember) to the subject of trade schools by various public meetings held at the Society of Arts, by a conference of the representatives of the municipal towns, at the Mansion-house in London, and by the establishment of a department of the Board of Trade specially for the encouragement of schools of this class.

"To ascertain how far there is occasion for the establishment of a trade school in Bristol, and what means the city supplies of supporting it, I have referred to the Bristol Directory, and counted up the number of manufacturers, tradesmen, and master-workmen, the principles of whose manufacturing or mechanical pursuits or trade require—to be thoroughly understood—a knowledge of certain elementary principles of science which might be taught in a trade school; and I find the number to be 1708.

"This list I have divided into three groups. The first contains the trades, eighteen in number, which are connected with building. There are 750 tradesmen in this group. The department of school instruction adapted to youths intended for any of the trades composing it, will be understood by a reference to the 'Builder's Price Book.' It is sufficient to say that youths might, at such a school as I propose, be thoroughly familiarised with measuring, and made to acquire facility, precision, and accuracy, in all the various calculations referred to in that book; and might further be made to comprehend the principles on which those calculations are founded. If in addition to this acquirement they were instructed in levelling, in geometrical drawing, in taking plans, and in those principles of experimental science which are connected with ventilation and sewerage, and with the lighting and heating of buildings, they could not fail to enter on the trade of the builder with great advantages to themselves and to the public, as compared with other persons who have received no such previous instruction.

"The second group contains 72 trades, giving occupation to 600 manufacturers or tradesmen, whose pursuits come under the general designation of mechanical pursuits, and require—that the principles on which they depend may be understood—an elementary knowledge of mechanism, and of the science of practical mechanics.

"The third group includes 62 trades or manufactures, giving occupation to 358 manufacturers or tradesmen, dependent upon the experimental sciences, and, more particularly, upon chemistry; of which science each is, in fact, little more than an application.

"I am far from alleging that a knowledge of these various branches of science is necessary for carrying on the different trades which I have enumerated. But I do allege that if carried on in ignorance of such branches of science, they are carried on in ignorance of the principles on which they rest; and that whosoever so carries them on, misses that opportunity for the improvement of his mind which is supplied by the daily habit of reasoning and understanding on what he is about; that he fails of one of the highest pleasures of which the human mind is capable—that of thus reasoning and understanding; and that he is wanting in that which is a legitimate source of moral dignity and self-respect. I allege further, that, taken collectively, these trades cannot but suffer, in a commercial point of view, from an ignorance, on the part of those who carry them on, of the principles on which they depend—it being impossible but that new and improved processes of art and manufacture and expedients of construction should result from such knowledge."

The Rev. Mr. Moseley then goes on to recommend that a navigation school should be united with the trade school, as having a direct bearing upon the trade of Bristol; and states, that "the experience of the Royal Naval Schools at Greenwich Hospital has shown that a sound knowledge of this science, in theory and in practice, may be communicated to boys of fifteen years of age;" and that by this knowledge they become better conducted and more efficient sailors than they otherwise would be. It is recommended that the school should be thrown open generally to the inhabitants of Bristol, as small tradesmen, the higher class of mechanics, warehousemen, &c., &c., whose children may not have attended national schools, would be likely to avail themselves of it.

With reference to the expenditure requisite for the establishment and maintenance of the school, Mr. Moseley states, that that department of the Board of Trade, which is specially established for promoting this class of schools, will supply the requisite diagrams, models, &c. at half price. "The Committee of Council on Education has offered to elementary schools under inspection—and will probably extend to trade schools, constituted as *this* is proposed to be, as *advanced national schools*,—grants for the purchase of philosophical apparatus, to the extent of two-thirds of the cost;" and "will also probably give a grant in aid of *alterations* in internal arrangements, desks, fittings, and augmentations of salary to the masters, provided that they have received its certificates; and it will give stipends for the support of apprenticed pupil teachers." The probable scale of expenditure would be: Salary of head master, 100*l*. and house; salary of second master, 80*l*.; incidental expenses, 40*l*.—total 220*l*. The services of occasional teachers, in addition to those constantly employed, would be necessary, as the present masters do not possess the *technical knowledge* which such a school would require. The arrangement which, under these circumstances, would, perhaps, be found practically the best, would be to seek a head master who, besides being a good teacher and school-keeper, should have a general knowledge of experimental science and of practical mechanics. The second master should be obtained from the Greenwich Hospital schools, where there is a body of pupil teachers training to become masters of navigation schools. He would teach the navigation class; and, as he would be a good mathematician, he could, so long as the numbers are small, take besides this class, the class of the trade school corresponding to the first group of trades, those connected with building, whilst the head master took the other two groups.

For certain technical branches of instruction, and especially in the commencement of the school, occasional teachers would be necessary. In regard to the building trades, "A young architect or surveyor, who could spare an hour two or three times a week, to attend at the school, to give a short lecture in explanation of practical detail, would fully answer the purpose. All the rest would be done by the head and second masters. The same is true of the trades and manufactures included under the other groups, except that no single person would certainly be found capable of explaining the practical details of all the trades in either of these groups; although in each group different individuals would probably be found willing to give lectures in their own specialities. The best way of providing for this technical instruction, would, I think, at first be to fix a certain sum as the remuneration of each lecture or lesson, and to embrace such opportunities as might arise of getting competent persons to give such lessons. The sum so fixed might be ten shillings. To provide for the expense of these technical lessons, the guarantee offered by the Board of Trade might be asked. If two such lessons were given in each group of trades per week, the cost would be (taking forty weeks in the school year) 120*l.* per annum. For the mathematical, the mechanical, and the experimental sciences, which are the basis of all these trades, the masters permanently employed in the school must be held responsible. If, as is probable, the Committee of Council consent to apprentice pupil teachers in the school, or to allow stipends to assistant teachers, one of these should be employed by each lecturer or master, as, what is called a repeater (*repetiteur*) in the French schools. He is an officer whose business it is to assist at every lecture, to make himself thoroughly master of it, aided by the lecturer's explanations and notes, and to reproduce or repeat it to the class, giving them fuller explanations, impressing it more fully on their minds, and, as it were, compelling the reception of it. It is to be understood that the salaries of these pupil teachers would be paid altogether, and those of the assistant teachers in part, by the Committee of Council. One part of the day (probably the afternoon) should be devoted exclusively to technical and the other to general scientific instruction.

"An educational standard should be fixed for admission; which, for the present, may be reading, writing, and arithmetic as far as the rule of three. The fee should, I think, be sixpence per week, or five shillings per quarter, for the sons of workmen and tradesmen not employing journeymen, and one shilling a week, or ten shillings per quarter, for the sons of persons above that grade.

"The number of separate establishments in Bristol, in which trades or manufactures, in some degree dependent on scientific principles, are carried on, being 1708, and some of these employing upwards of a hundred men—it is not perhaps too much to assume that, connected with each, there would on the average be not less than three persons in a condition to avail themselves, for their children, of the education of the trade school, and who would derive benefit from doing so. If we include in this number those persons who, although not themselves employed in these trades or manufactures, are desirous that their sons should be employed in them, it is, I think, certain that this estimate is not in excess. This will give 5124 heads of families interested in the school, and in a position to benefit by it. It is not too much to assume that 150 boys would be collected from 5124 families. Fifty scholars might also not unreasonably be calculated upon for the navigation school which would give a total of 200 scholars. The fees of these scholars, at an average of 9*d.* per week each, would amount to 300*l.*, and this with the present funds of the school, if continued, would probably provide for its maintenance.

"In conclusion, I am desirous to call the attention of the Committee to the benefits which the surrounding national schools may be expected to derive from the establishment of the trade school. As, in the course of time, tradesmen, masters of ships, &c., might be expected to give the preference to boys educated in this school; to obtain an exhibition to it could scarcely fail to be considered among the boys of a national school a reward. Thus a motive to remain longer at school would be afforded; and a public opinion of the school favourable to learning, as a means of advancement in life to a poor boy, would be created. The character of the instruction in the national-schools of Bristol could scarcely, moreover, fail to be influenced by that of the trade school, receiving from it a more useful and practical bearing upon the pursuits of workmen, and the objects amongst which their lives are passed, so as to cause the occupations of after life to carry on the education of their minds which was commenced at school, and which at present ceases altogether with school, their school-life being wholly unconnected with the avocations which follow it. The name of the school should, I think, be 'The Bristol Trade and Navigation School.' It would be expedient eventually to establish an evening trade-school and an evening navigation-school. But another staff of masters would be required for this, and a distinct expenditure. It would be impossible that the same master could teach both schools so as to do justice to them."

To Correspondents.

J. B. will observe that we have no department for intelligence such as he sends, we have ceased to give it, thinking it better to devote our pages to subjects of permanent interest.

HINTS ON THE PRESERVATION OF THE HEALTH OF THE TEACHER AND PUPIL.

(*Continued from p.* 400.)

Thus, then, it has been shown that pure air, well-ventilated rooms (especially sleeping-rooms), moderate exercise, bodily cleanliness, plain nutritious diet in moderate quantities, at regular intervals, and proper periods of repose, both for body and mind, are important considerations for the maintenance of the health of schoolboys, and the physiological principles upon which these considerations are founded, having been briefly explained, it will not be difficult to modify the rules deduced from them, so as to suit individual and particular circumstances.

The habits of the teacher being sedentary, and his mental powers being in active exercise for the greatest portion of the day, he also is liable to various disordered states of health resulting from these circumstances; inactivity of the liver and consequent torpidity of the bowels, loss of appetite from want of tone in the stomach, heartburn, acidity, unpleasant taste in the mouth, showing imperfect digestion, want of sleep and restlessness the result of disordered circulation within the head; pimples on the face, the combined effects of obstructed perspiration and impure blood; cold hands and feet, proving a feeble circulation in those members; are the annoyances from which the teacher frequently suffers. All these affections have their origin in a want of equilibrium, or accordant action between the nervous and vascular systems, the functions of the brain, and the action of the heart; and hence all means used to prevent the recurrence of these symptoms of ill health must be formed upon the principle already mentioned, not to exert or constantly bring into use one organ or system of organs to the neglect and desuetude of others. The same precautions regarding exercise, diet, &c., mentioned as conducive to the health of the pupil, are also applicable to the teacher. By exercise is not here meant an occasional rural ramble or a day's holiday, but exercise taken regularly and daily—the one fatigues, the other invigorates; neither is exercise properly taken if the mind is allowed to dwell upon the study or pursuit of the day, relaxation is required, the mind must be "unstrung." That man makes but a poor use of his leisure hour who meditates as he walks, and returns to his study or his desk to pen his rambling cogitations. Hence some cheerful occupation or gentle athletic amusement is required, to disengage the mind for a time from all deeper and more useful exertion. A man who absents himself from his sedentary occupation for a few days, or a week or two in the year, "to recruit himself," finds little or no enjoyment. His health being already far from robust, he suffers from the fatigue of travelling, and requires time to become reconciled to the temporary change in his habits and associates; hence for the first few days he is ill at ease and uncomfortable. Under these circumstances he cannot find any attraction or enjoy any pleasure on the change from a heavy town atmosphere, or a confined school-room, to a pure bracing air and an unclouded glimpse of heaven's daylight. He feels dissatisfied and wishes himself back again, and perhaps by the time when change of air and absence from occupation have so far invigorated his system, and refreshed his mental powers as to enable him to appreciate the various natural beauties and attractions about him, it is time for a hurried return to his daily avocations. Everything worth doing at all, especially in matters pertaining to health, and calculated to assist us in the performance of the various duties of this life, is worth doing systematically and regularly; and therefore moderate exercise taken daily is more beneficial and permanent in its good effects than distant periods of total relaxation. The diet of the man of sedentary occupation cannot be too simple and unstimulating. His stomach never possesses too much tone, and if it digests a sufficient quantity of nutritious food to supply the wants of the body, without calling upon any one of the organs concerned in the processes of assimilation to perform more than its due proportion of work, it has done all that can be expected from it, and all that is conducive to the health of a man, whose nervous energy is chiefly engaged on maintaining the various functions of the brain in their integrity. The transitory effects of stimulating articles, either of food or drink, instead of giving tone to the system, or strengthening the stomach (upon which organ their primary operation is manifested), only lead to debility and irregularity of action. Whatever for a time excites either the nervous or the muscular system is sure to be followed by a period of corresponding depression and inactivity, and there will be defective exercise of function in the various organs implicated, until all oscillation between the two extremes has subsided, and a healthy equilibrium is established. The use of stimulants, whether their effects are local or general, soon becomes habitual, and after a time even necessary. A stomach accustomed to the use of condiments will refuse after a time to digest food in the preparation of which they are not introduced, and the instances in which a general stimulant appears to be almost necessary for the enjoyment of life are too numerous and melancholy to be mentioned. Those of studious habits should, therefore, carefully avoid such things; for, however pleasing their temporary effects may be, we may be assured that in all mental labour that work is best done, and is more sure to manifest evidences of sound judgment, which is accomplished by the agency of an even-current of ideas, and a continued and consecutive exercise of the intellectual powers. The duties of the teacher, to be faithfully performed, require the exercise of patience, perseverance, and an ability to hope and strive for success under all the disappointments, waywardness, and cross purposes exhibited by his youthful charge; but without the possession of mental serenity, and an even mind, he cannot practise these important virtues. The man who is alternately excited and depressed is liable at one time to exhibit anger and impatience, and at another to discharge his duties in a careless and indifferent manner, to get rid of the tasks of the day with as little trouble as possible, and boys soon perceive these inconsistencies and easily avail themselves of the irregularities to which they give rise.

The disorders to which men of sedentary habits are most liable are those of the digestive organs, assuming some form of that Protean disease called dyspepsia; and it is nearly always the case when the teacher, the hard-working student, or the man whose occupation is chiefly in-doors, suffers from a common catarrh, a sore throat, inflamed eyes, or any other local disease, that the state of the digestive organs have first to be corrected before any measures can be adopted for the cure of the more evident complaint; and it is a very common occurrence for the local disease to disappear under the treatment necessary to restore the functions of the stomach, the liver, and the bowels, to a healthy state. Men of sedentary and studious occupation are often very fond of "doctoring" themselves, and are frequently valuable patrons to the quack and the empiric; some because the name of the symptom from which they imagine they are suffering is mentioned in one of the "Pandoric" advertisements of the day; and others attempt to justify such folly with a self-sufficient air, quoting the old saying, "that if at forty a man is not his own physician he is a fool." Let those who pin their faith to this "wise saw" be respectfully assured that they have no right to the *former* of the two appellations. It does not require much medical knowledge to advise, that if any article of food or manner of living is found to disorder the stomach, and to be followed by inconvenience and discomfort, the best way to remove these symptoms and prevent their recurrence is at once to abandon the offending diet, and afterwards to abstain from its use; but simple and self-evident as this precaution is, it is one very generally neglected, and that too by individuals who have repeatedly suffered the penalties of their indiscretion. They have been accustomed to find speedy and efficacious remedies, and therefore do not fear to transgress again. It does not follow that because a dose of carbonate of soda removes acidity, a bottle of soda water soothes the stomach after a debauch, or a purgative restores the action of the liver and bowels after their functions have been deranged, that these organs at the same time regain their wonted vigour, or that the effects of these irregularities are destroyed. It is by a repetition of disordered function that an organ becomes diseased, and the difference, in medical parlance, between the words "disorder" and "disease," is that the former refers to the functions of an organ, the latter to organic changes in the structure of the organ itself. The frequent administration of medicines, especially those which act on the stomach and bowels, soon becomes an habitual necessity; and these organs, becoming accustomed to their stimulant and corrective effects, refuse to perform their functions without some artificial aid. In those of sedentary habits the disordered functions just mentioned have their origin in want of tone, and consequent irregularity of action, and therefore the operation of a drug which stimulates the bowels to an increased effort, and relieves the temporary inconvenience, is followed by corresponding inactivity, and thus the want of tone is increased and perpetuated. It is true that a "dose of physic" is occasionally necessary; but after it has answered the purpose for which it was taken, the causes which gave rise to such necessity should be strictly avoided, and the means already noticed calculated to increase the tone and restore the vigour of the general health should be made available. In no pursuit or calling is it more true that

"A little learning is a dangerous thing,"

than in the practice of medicine; and yet how many there are who, without any medical education, and no knowledge either of the principles upon which the healing art is founded or of the formation and natural laws of the human body, profess to know "something of medicine." If it is true that a man who is his own lawyer has a person not over-burdened with wisdom for his client, the individual who, without any previous knowledge, acts as his own physician, and prescribes according to his own ideas and sensations, which, governed by his body, are sure to be far from correct or healthy, is as much more deficient in wisdom as life is of more value than wealth. Those who thus profess and practise "a smattering of medicine," are often the means of doing much harm and exciting a great deal of unnecessary anxiety. With them the occasional palpitation to which the studious are liable, resulting from some gastric derangement or irregular supply of nervous influence, is "disease of the heart;" pain in the abdomen, from the presence of some irritating matter, is "high inflammation;" and the accelerated evening pulse of a catarrh is "fever." Now these things ought to be guarded against. Let the teacher be the teacher, let the man of science follow his pursuits, let the reader read as much and imagine as little as he likes; but do let the medical practitioner be the medical practitioner. He has spent years of time and labour; is at your beck and call night and day; he brings all that science and experience have taught him to your aid, and the least you can do is to treat him as though you considered he had not spent his time and labour for naught. It is true, the medical practitioner is often summoned when disease exists more in the imagination of kind parents and friends, or in the perverted sensations of an overstrained brain, than in actual fact; but, even in these cases, it is a pleasing duty to remove groundless fears, to give hope and encouragement, and to endeavour to "minister to a mind diseased."

In establishments for the young, the inmates are naturally liable to many of those slight deviations from health incident to their age, sex, and habits of life; and there are many, who, from their previous knowledge of children, can readily detect these ailments, and trace them to their proper cause. For instance, the domestic treatment for a slight cold, clearly referrable to exposure to damp and change of temperature, such treatment consisting of a foot-bath, a basin of warm gruel, and a comfortable bed, so as to cause perspiration and restore the action of the skin, is far from objectionable; but it ceases to be so when calomel, antimony, or James's powder are administered. The diarrhœa caused by eating unripe fruit or rich cakes, &c., is usually treated by a dose of rhubarb and magnesia, or castor-oil, with the intention of removing the offending matter; but if this disordered state of the bowels continues, it is not right to give chalk mixture with opium, or Dalby's carminative (which also contains opium), without medical sanction. In like manner, the exhibition of emetics (the drug used being ipecacuanha, for no other kind of emetic, unless it be mustard and water, is safe in the hands of the uninitiated), when there are evidences of foul and loaded stomach, is often beneficial and generally harmless; but to administer blue pill, or hydrocyanic acid, or to apply leeches afterwards, would be playing with "edge tools," more likely to do harm than good. Establishments for the young are also liable to be visited by epidemics, and to the rapid spread of contagious diseases when they have once obtained admission: under these untoward circumstances, the responsibilities and anxieties of those who have the management of affairs are many and serious, and, as a matter of prudence, and likewise as a means of sharing the responsibility involved, medical advice should be immediately obtained. Many people run away with the idea, that if a number of children under one roof are about the same time or consecutively attacked with disease, that it is necessarily contagious; and hence a great deal of unnecessary alarm is occasioned, and, from the prevalence of this error, many diseases are believed to be contagious which are not so. It is possible for a number of individuals residing in the same house to be all at the same time exposed to influences calculated to originate disease, and consequently to suffer at the same time. There are two ways of checking the spread of diseases thus occasioned: either to get rid of the cause, or else to go away from it. In the epidemic at Tooting, already alluded to, the disease lost its fatal character as soon as the children were taken away: and no doubt the mortality occurring in some instances after removal would have been much diminished had the poor sufferers been removed before their blood had become so thoroughly impoverished and depraved. Hooping-cough often attacks all the younger branches of a family at the same time, or in rotation; a whole household suffer from catarrh together; and, in certain states of the atmosphere and seasons of the year, influenza is very fatal to the aged and debilitated; but these are only evidences that different individuals, alike predisposed to disease, are at the same time exposed to the same exciting causes. When an epidemic breaks out in a large establishment, all available means should be employed to ascertain if the exciting causes are of a local character, and if possible to get rid of them: and the next thing to be done, especially if the disease is of a serious nature, is immediately to remove the healthy from the diseased; not to separate them under the same roof, but to take them away to some more healthy locality. A contagious disease may first make its appearance in an epidemic form, but the moment its real nature is discovered, then instant separation of the diseased from the healthy becomes imperatively necessary. Measles, scarlet-fever, and small-pox spread with such rapidity among children, that they are frequently attacked even after removal from the place where the disease first originated; and it is often a question difficult to answer, and involving many grave considerations, whether it is more prudent to remove children, and thus run the risk of spreading the disease in another locality or introducing it into a family at home, or to let them remain under proper treatment until all probabilities of contagion have disappeared. As a general rule, and especially in a limited establishment, we certainly approve of the latter course.

The diseases just referred to have what is technically termed "a period of incubation," during which the disease is in the system; but nature has not commenced the increased action, and thrown out the eruption, by which the "morbific matter" is got rid of. The incubative stage—the period during which the seeds of the above-mentioned diseases are latent—differs in duration, not only in each disease, but likewise in different constitutions and temperaments; and it unfortunately happens, that in the most serious of them all, small-pox, this period of uncertainty and latent mischief is the longest. No child should be admitted into an establishment if the parents cannot furnish satisfactory proof of successful vaccination; for one case occurring in its natural malignity, unmodified by the effect of previous vaccination, does more to foster and perpetuate this loathsome disease than a dozen cases of that milder type following the successful performance of this simple and painless operation. However, let us hope, that in a few years this "enemy to the human face divine" will be driven from among us. The "*compulsory* Vaccination Act" is now the law of the land: strange title for an Act of Parliament, for the government of Englishmen in the nineteenth century! But it is not more strange than it is necessary. It was stated, some years ago, that in the island of Ceylon, with a population of upwards of 30,000, there had not been a case of small-pox for eight years; and that, twelve years before this statement was made, the vaccination of children was enforced by a most stringent law. Thus four years were required for the extinction of the disease. When the Act of Parliament referred to has got into working order (and we earnestly hope that its provisions will be most stringently enforced) cases of unmodified small-pox will become more few and far between. Thus, the power of the disease will become diminished, and its contagious nature weakened. Then there will intervene a period when all small-pox will be of the modified kind, and thus a still further decrease will take place in its spread and propagation, resulting from the dilution of its poison, until, at last, it will become a record of the past, and the beaming countenances of England's fair daughters, and the noble lineaments of their sons, will possess that beauty and manliness which is the distinguishing peculiarity of the English face. But this will be a work of time and perseverance. There are men so depraved that they will oppose it, simply because it is the law of the land—it will be called tyrannical, inquisitorial, and coercive; but still, if all who wish for the well being of their fellow-men use their influence (and teachers and others who have the care of the young can lend a very useful hand), the end will be accomplished. Time, though a slow, is a very successful "table-turner." The great and good Jenner was imprisoned: now, those who do not avail themselves of his discovery will have an excellent opportunity allowed them to meditate about him during their own incarceration; still, until this welcome period arrives, small-pox will occasionally be prevalent. When a case occurs in a school, the best plan is to remove the sufferer as far as possible from his fellow-pupils, and to forbid all even the slightest approach to intercourse. The existence of the disease (in the first case occurring in any establishment) is rarely discovered until the pustules show themselves; and in this stage of the disease removal would not be safe, even if it were desirable. A step often taken under these circumstances, and by no means an imprudent one, is to vaccinate all the boys and girls in the school. If from the effect of the operation in their younger days they are proof against small-pox they will be proof against vaccination; and, if the virus "takes," it is evident that re-vaccination was desirable.

The period of convalescence, after the small-pox has run its course, is one involving much anxiety, and requiring the exercise of a good deal of caution. It is generally admitted that, even after the pustules have died away, there is for a time the capability of spreading the disease by contagion, and the only difference of opinion is concerning the time which must elapse before the power of the "morbific matter" disappears. This being the case, it is better to err on the safe side than to run any risk, and therefore it will be prudent in any establishment where a case of small-pox occurs to place the patient under "quarantine," for at least twenty-one days after the eruption has disappeared; scarlet fever and measles are neither so important or so dangerous as small-pox, neither is so much caution required after the disease has passed away and the new skin is formed; but they often leave many annoying symptoms behind them, such as sore ears and eyes, and deafness, and if the patients are exposed to cold at too early a period a peculiar form of dropsy is very likely to supervene. After perfect recovery from these diseases children should be sent home to recruit a little, and the brain should not be called upon for much exertion until the health of the body is firmly established. When scalp diseases and other affections of the skin occur among children, the medical attendant should be at once acquainted with the fact, and his instructions and suggestions carried out with the utmost strictness. In establishments where the precautions given in the commencement of this article respecting cleanliness, wholesome diet, and plenty of fresh air are properly observed, skin diseases will rarely occur; and even when they do, their appearances and causes are so many and different that no general rules beyond those already given can be laid down.

Thus, then, some of the principles upon which regulations for the preservation of the health of teachers and pupils should be founded have been given, and the physiological conditions from which these principles are deduced have been briefly explained. These precautions and regulations are intended to be general in their application; for it is impossible to lay down rules applicable to each individual case, much must be left to the discretion of those to whom these remarks are addressed. The feeble and delicate will require more care than the healthy and robust, and those of excitable temperament and scrofulous habit will be more prone to disease, and more readily suffer from the effect of circumstances calculated to cause ill health, than those whose nervous system is less susceptible, and who are free from hereditary taint. The slightest deviation from health in the precocious, and those who study closely, should command immediate attention; for (as was shown in the paper before referred to*) they are peculiarly liable to acute diseases of vital organs. It is likewise important to summon medical aid at the commencement of disease, and not to tamper, perhaps exasperate, and certainly lose time by the practice of "domestic medicine," especially when carried beyond the application of means which if they do no good cannot do any harm. Teachers are also warned of the folly of "doctoring" themselves, and wasting their substance on quack medicines and advertised panaceas. It is much more prudent and economical, when the use of simple means do not succeed in removing any symptoms of ill health, at once to seek proper advice. The frequent occurrence of disordered states of the stomach (and these are symptoms to which the studious and sedentary are peculiarly subject) often lays the foundation for permanent disease of this organ, or of the liver and kidneys; and it is much better to get rid of a slight deviation from health, and to receive advice, by the observance of which a recurrence may be prevented, than to be frequently taking medicine, absent from duty, and finally being obliged to "lay up" altogether. The laws which Nature has given for the preservation of health are plain, simple, practicable, and almost instinctive; and the more artificial our habits of life become the more frequently shall we be called upon to pay the penalties of our transgressions, and therefore those who wish to possess the "*mens sana in corpore sano*" should be as simple and natural as possible in their habits, and use all means at their command to maintain the integrity of their well-being, that they may possess that more intellectual part of it required for the performance of those duties, as teachers and pupils, in its full vigour and usefulness. W. P.

Note.—As the fearful occurrence at Tooting has been noticed, and as some observations made at the time bear directly on the subject in hand, and illustrate the remarks already made in reference to the effects of impure air, and consequent impure blood, a further account will perhaps be acceptable. After a careful and thoughtful examination of all the facts I could collect, both from my own observations and from the statements of others on whose integrity and judgment I have the firmest reliance, I came to the conclusion that the children, in the late Mr. Drouett's establishment at Tooting, had a proper and copious supply of good wholesome plain nutritious food, of a nature fitted for the digestion of children; and I have never found reason to regret the expression I made use of when examined by Mr. Baker, the coroner, at which time I stated, that "if, when I died, I left a young family behind me, and felt certain that they would never sit down to a worse meal than the children at Tooting did, I should, so far as that matter was concerned, die content." It was the want of pure air that originated the disease. In the rear of the building was an open pestilent ditch, giving off noxious gases; and during the night, when children require the greatest quantity of pure air, when they are exhalng carbon from the lungs and from the pores of the skin, and when the system is most easily affected by hurtful agencies, they were huddled together in crowded beds—in close, badly-built, unventilated dormitories. In the largest of these sleeping-rooms ventilation was impossible, even if it had been attempted, for it was a long narrow room, with windows only on one side, and those looking into an enclosed court; and it was in this room, in which upwards of 100 children slept, that the disease first broke out. Having once begun it spread rapidly, not that there was any satisfactory evidence of contagion—there are many facts to support a contrary opinion—but because the system of each child was in a state ripe for disease, the whole mass of blood was poisoned, the nervous system was depressed, the "*vis medicatrix naturæ*" was destroyed; and thus simultaneously disease broke out in all parts of the establishment. The various metropolitan parishes sent their medical officers, and all those children who were in a fit state for removal were removed; but in numerous instances the disease appeared, either in a mild or a severe form, some days after they were taken away. I had the care of 100 children after their removal, and in nearly every child premonitory signs of disease showed themselves within a week — five had confirmed cholera, and died. Another fact, showing the impurity of the blood in these unfortunate children, may be gathered from the statement, that out of 200 children whom it became my duty to examine carefully I did not find *one* child free from skin disease of some kind or other. The establishment was over-crowded, the school-rooms were crammed, the bed-rooms were packed, and a building which would have maintained 700 children in health was made a pest-house for 1300.

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* *Vide*, English Journal of Education for September, 1853. Article, "Intellectual and Moral Training of Children."

THE ARCTIC REGIONS.

The] intelligence recently received from the Arctic Seas has again directed public attention in an eminent degree towards that distant and inhospitable portion of the globe. Not that the frozen lands and ice-bound seas which lie within the northern polar circle had previously wanted a place in the recollections and anxious regards of the British nation: they have been the scene of too many triumphs achieved by British hardihood—too frequently of sufferings endured as only brave men *can* endure to suffer—ever to be allowed to pass into oblivion. And, during many recent years, the hopes of the nation at large have been anxiously directed towards expected intelligence of the fate of the gallant band of explorers who left our shores in the early part of 1845, and whose subsequent fate still remains so painful a mystery.

Nearly nine years have now elapsed since Sir John Franklin and his brave companions left our shores—the ships "Erebus" and "Terror," which composed the expedition, having sailed from Sheerness in May, 1845. The object of the voyage, as is well known, was the discovery of a passage from the Atlantic into the Pacific Ocean, round the northern shores of the American continent—that is, of the famous *North-west Passage*, the search after which has exercised the hardihood of English navigators, with the exception of a few brief intervals, during a period of three centuries. It has been ascertained, by unquestionable remains that mark the site of their encampment, that the first winter of the expedition (1845-6) was passed at or near a point of land called Cape Riley, which the reader will find marked in the maps upon the eastern side of the entrance to Wellington Channel, a broad arm of the sea leading northward from the well-known Barrow's Strait. Beyond this all is doubt and mystery. Whether the further course of the missing voyagers were to the west, to the south-westward, or to the northward (up the channel above-mentioned), is unknown, unless in regard to the negative inference which may be drawn from the absence of any further traces of the expedition in either of the two former directions, towards which the most eager and scrutinizing search has, during several years past, been directed. The last-named direction—that of Wellington Channel—is at the present moment the scene of a similar search, but one hitherto (although its shores have been explored to a considerable distance northward) made without any more successful issue.

The history of the several expeditions that have left our shores in the search after Franklin and his gallant companions forms in itself an important and eminently instructive chapter in the records of Arctic discovery. The first of these searching expeditions was despatched in the early part of the year 1848, up to which time (or until within a short period of it) no particular anxiety was felt respecting the safety of the absent voyagers—the ships having been amply provisioned for three years, and their return scarcely expected before the expiration of that period. But the entire absence of tidings respecting them during the long interval first awakened alarm, and at length aroused the most anxious surmises respecting their fate. The plans of search that have been pursued have embraced both the eastern and western entrances to those portions of the polar seas in which it was supposed the missing expedition might be imprisoned—the entrances, that is, by Baffin's Bay and Lancaster Sound on the one side, and by Behring's Strait on the other—as well as the entire range of the northern coast of the American continent. It is an honourable and gratifying testimony to our common humanity to have to record the fact, that the interest aroused in this search has not been confined to the nation whose sons had adventured forth on an expedition of so much peril, but that the people of other lands—Americans, French, Russians—have entered warmly into its objects, shared its dangers, and perilled their lives (in at least *one* instance of present melancholy notoriety have, alas! sacrificed life) in its earnest pursuit.

We are not, however, about to attempt a record, however brief, of the expeditions in search of Franklin. Our purpose in referring to the subject of Arctic discovery is due to the fact that the intelligence lately received from Captain M'Clure, in command of the "Investigator," one of the vessels engaged in the search, places beyond a doubt the existence of the North-west Passage—the discovery of which was the object of Franklin's expedition, as it had been of so many previous expeditions of a like description. The *North-west Passage* exists, though no ship has yet traversed it; but its entire extent, from the one ocean to the other, has been passed over by one of our brave fellow-countrymen, Lieutenant Cresswell, who brought home the despatches which record the circumstances of the discovery.

The "Investigator," commanded by Captain M'Clure, (in company with the "Enterprise," under Capt. Collinson,) left England in January, 1850, and, passing into the Pacific through the Strait of Magellan, entered Behring's Strait early in the ensuing summer. Her further progress has been made in endeavouring to reach, by the directest possible route, the neighbourhood of Melville Island, upon the shores of which Sir Edward Parry (advancing from the eastward) had passed the winter of 1819-20. In the single summer of 1850, Captain M'Clure succeeded in pushing his ship through the open (though often dangerous) channels of water that were found to extend between the ice and the shore, along all that portion of the North American coast which extends from Behring's Strait to Cape Parry,* and thence in a north-easterly direction through a narrow channel (to which the name of Prince of Wales's Strait was given) between newly-discovered lands on either side. The name of Prince Albert was bestowed upon the land to the eastward of this strait, while that to the westward was called Baring Island. Near the northern limit of Prince of Wales's Strait the "Investigator" became frozen in amongst the ice, upon the 8th of October, 1850, and there she passed the ensuing winter. Exploring parties sent out from the ship soon ascertained that the strait in which she was thus fixed was connected with a broad channel lying to the south of Melville Island, and forming the continuation of Barrow's Strait—the whole being thus a continuous channel of water, or rather of ice, stretching between the northern extremities of the two great oceanic basins of the globe. The summer of 1851 arrived without any possibility of pursuing an easterly or north-easterly course, owing to the huge masses of ice that were continually drifted, under the influence of opposing winds, to the southward. Capt. M'Clure hence determined to retrace his steps down Prince of Wales's Strait, and endeavour to pass round the western side of Baring Island, thence again to proceed along its northern shores to the eastward. He succeeded in accomplishing this, in so far as to reach an inlet (upon which the name of Mercy Bay was bestowed) on the north side of Baring Island, towards the end of September, 1851. There the "Investigator" again became frozen up, and there she has remained —firmly fixed in her icy prison—up to the date of our latest intelligence, or for a period of little less than two years; the entire summer of 1852 having passed away without the slightest semblance of disruption in the ice, and consequently without the possibility of the vessel being moved even a single yard from her constrained position. Nor does there appear much reason to expect that the recently elapsed summer will have been attended by any different result, the strong probability being rather that the ship will ultimately have to be abandoned; her crew returning to England by means of some of the other searching vessels which have communicated with them to the eastward.

It is to the efforts of those engaged on one of the latter that we owe our present intelligence of Captain M'Clure's achievements. In April, 1852, a party from the "Investigator" crossed the ice to the eastward of Baring Island, and deposited upon the south side of Melville Island a document containing an account of their proceedings, and of the position of their ship. This document was afterwards discovered by the officers of the "Resolute," which ship, under the command of Captain Kellet, had entered the ice through Barrow's Strait, in the summer of last year (1852), and which passed the winter of 1852-3 at Dealy Island, upon the south side of Melville Island. Means were immediately taken to communicate with the ice-prisoned crew of the "Investigator;" and the subsequent journey of Lieutenant Cresswell over the ice, with a portion of the "Investigator's" crew, from Mercy Bay to Cape Riley, at the mouth of Wellington Channel, with his voyage thence homeward in the "Phœnix"—a small steamer which had been sent from England to convey stores and despatches to the searching squadron under Sir Edward Belcher (and of which Captain Kellet's ship, the "Resolute," formed a part)—completed the circle of transit from the one ocean to the other.

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* A headland lying east of Cape Bathurst, and under the meridian of 123° 40′ west.

The "North-west Passage," then, has been proved to exist. In 1819 Sir Edward Parry advanced *westward* from Baffin's Bay (through Lancaster Sound and Barrow's Strait) as far as the meridian of 114°, or to the western extremity of Melville Island, upon the southern shore of which he passed the succeeding winter. In 1850-1, Captain M'Clure has proceeded *eastward* from Behring's Strait to the meridian of 118°, that is, to Mercy Bay, on the north side of Baring Island—a locality which is little more than sixty geographical miles removed from the extreme western point of Parry's discoveries, made thirty-four years since. Thus, from opposite sides of the great region of search have the successful voyagers joined their results, and have solved the problem that had kept awake the attention of so many generations!

The North-west Passage has been proved to exist, though it is admitted on all hands to be nearly, if not altogether, impracticable to ships; so that the discovery possesses no value in a commercial point of view: nor, indeed, had any expectation been entertained, for many years past—for a period long prior to the departure of Franklin's expedition from our shores—that the passage, if discovered, would be capable of being traversed, except at such risks and perils as would render its use, for the purposes of commerce, altogether out of the question. But higher motives than those of mere commercial advantage have been called into action in the long series of Arctic expeditions that have left the shores of Britain, the record of which will always form one of the most attractive narratives of the naval annals of our country—a narrative of which Britain's sons in all future ages may well be proud. The interests of science, combined with that natural desire for individual distinction which is inherent in man, and which has prompted to so many deeds of note, in all times and in all ages, have been the sole impelling motives to all the later expeditions of adventure in the Arctic seas; and those which have failed (as so many have done) in realizing the prime object of the search have yet not been barren of results, and highly valuable results, in other regards. Physical science has been advanced in an eminent degree by the varied observations that have been made upon the climate and natural productions of the regions visited, as well as on the temperature and other conditions of the ice-covered seas by which they are enclosed, together with those referring to the abstruser subjects of magnetism and electricity, and the bearings of the former upon the movements of the magnetic needle.

The North-west Passage has been proved to exist; but, by a curious and seemingly contradictory succession of events, the *completion* of the discovery that a channel of connection exists between the Atlantic and Pacific Oceans has been made from the *westward* instead of from the eastward, on which side it had so often and so long been sought. If Captain M'Clure should succeed in bringing his ship home to England through Barrow's Strait, it will after all be a north-*east* passage, from the Pacific to the Atlantic, that will actually have been made, in place of the often-sought north-western track from the latter to the former of those great oceans.

The main purpose, however, held in view, in addressing ourselves to the subject of Arctic discovery in these pages, was to direct attention to the numerous instructive topics which the intelligent teacher will discover in connection with it. Many of the features that distinguish Arctic adventure are of a nature eminently calculated to awaken the attention of the learner, to fix his thoughts, arouse the spirit of inquiry—in fine, to teach him to *think* and to *reason*, instead of merely learning tasks by an effort of dull routine. Within the brief limits that remain to us we can only indicate cursorily a few of the more salient points of the subject that seem to us to possess such characteristics.

The *climate* of regions enclosed within the polar circle is, of course, a notable (to some, it may at first sight almost appear a trite) subject of remark. To those who are personally exposed to its intense severity, it forms, of necessity, the most prominent circumstance of regard. A condition of the air in which the thermometer for months together registers a temperature of many degrees below *zero*, and in which it sometimes sinks to 65° lower than zero—or to 97° below the freezing point—may well be contrasted with that moderate degree of heat which distinguishes the middle latitudes of the temperate zone, and yet more with the extreme heats of intra-tropical regions. Mercury no longer retains, in these latitudes, the power of indicating by its expansive property the comparative warmth of the air: it becomes frozen into a solid mass, which might be beaten out mechanically on the anvil, like other metallic bodies. Spirit of wine alone supplies its place in the bulb and tube of the thermometer. Perhaps many persons realise more fully an idea of the intensity of the cold experienced during the long Arctic winter, when they read—as in one of the instructive narratives of recent polar adventure—that the soup and coffee, warmed under cover of tents erected in the open air (for the use of the sledging parties), froze almost as soon as taken off the fire. When resting for the night, the men lay packed together as closely as possible within the tent, for the sake of greater warmth; but the outside men were frequently frozen to the ground, so that it was found requisite to use the hatchet, in the morning, in order to free them from their icy bonds, and enable them to rise! In Parry's voyages we find it related that the wine froze in the bottles: the port was congealed into thin laminæ, which lay loosely, and occupied the whole length of the bottle; white wine, on the contrary, froze into a solid and transparent mass resembling amber.

But besides its examples of extreme severity, the observation of Arctic climates has lent abundant confirmation to the fact, that atmospheric temperature is in great measure independent of latitude; or that, at any rate, its final determination is affected by many other circumstances than mere distance from the equator. The superiority, in regard to temperature, of western to eastern coasts is here, as in other parts of the globe, made manifest. Between the parallels of 60° and 70°, in the same latitudes which, on the western coasts of the European continent, comprehend the shores of Norway, with their high summer temperature and even comparatively moderate winter climate, the shores of Hudson's Bay and the adjacent insular tracts of land that lie around its northern limits are constantly blocked up by enormous masses of ice, fixed and solid during the greater part of the year, and only put in motion during a brief period of summer by the combined force of currents and stormy winds. The western shores of Greenland, again, are habitable in latitudes which are rendered inaccessible by eternal ice upon the eastern side of the same region. We trace in these results the influence, in no small degree, of those movements of the sea to which attention has been directed in a recent number of this periodical.

Even the intensest severity of the arctic cold is, however, sustained with comparatively little inconvenience when the air is calm and still, as it often is in very high polar latitudes. It is only during the prevalence of high winds, accompanied by blinding showers of drift snow, that the cold is felt in its extremest measure.

The perfect clearness of the atmosphere which frequently prevails in the polar regions enables objects, as in high alpine tracts, to be distinguished at distances far beyond the reach of ordinary vision. The same circumstance aids in the conveyance of sound to extraordinary distances. Objects may frequently be seen with perfect distinctness at a distance, in a direct line, of forty (and sometimes even of sixty) miles.

The ice, on land and sea alike, forms everywhere the most prominent feature of the scenery in these monotonous and dreary portions of the globe. Solid mountains of ice upon the land, huge floating islands (or bergs) of ice within the sea; assuming, under the influence of atmosperic changes, the most various and fantastic form; sometimes wearing, to the eye of the anxious voyager, the semblance of distant buildings, with castellated turrets, high towers and steeples, or similar structures. The various stages through which the ice passes, from the initial formation of minute chrystalline and needle-shaped particles which seem merely to *thicken* the water, until it becomes gradually fixed into the vast fields of floating ice, of many miles extent, with huge masses piled up irregularly by the action of the waves, form a subject of inquiry possessed of the highest interest. The immense floating icebergs are mostly of land formation, glaciers formed by the accumulating snows of centuries upon the shores of Spitzbergen and other arctic lands, and detached by the influence of storms, aided by the expansive property of water while in process of congelation. Few things can equal in sublimity of interest the descriptions, given in so many narratives of polar adventure, of the tremendous power exerted by the vast moving masses of ice when driven into violent contact by the winds and currents; portions of them crushed and literally ground into powder by the force of the shock, accompanied by a noise that is heard at the distance of miles—the whole presenting a scene of elemental strife that might well appal the stoutest hearts. Under such circumstances the largest vessels have in many cases been lifted up bodily by the ice that has forced a way beneath them, and raised high out of the water upon the sides of the berg; while, in some instances, the ill-fated ship has been crushed (or "nipped," as it is technically termed) between the approaching masses. To these and similar phenomena, however, our present limits allow us to do no more than refer in general terms.

Another class of observations connected with these ice-bound and perilous regions refer to the atmospheric phenomena that are frequently observed; such, we mean, as those brilliant displays of the aurora that help to diversify the long polar night, and the various imagery presented by *parhelia*, or mock-suns, and other appearances which are due to the refractive power of the air, and which impart to the sky a strange and unwonted glory. The images of surrounding objects, including the ships of the voyagers, are sometimes seen high up in the heavens, in an inverted position; in rarer cases, a double (or even a triple) image is thus produced.

In travelling over the ice, during the summer season, the hours of night are generally preferred for the journey, in order to avoid the strong glare of the sun reflected from the white and snowy covering around, which affects the eyes injuriously. The peculiar brightness of the atmosphere which results from the uniform presence of the ice is known as the *ice-blink*. A darker aspect of the more distant sky often indicates to the Arctic traveller the presence of open water beneath.

Enough, however, has been said to indicate the general character of the instruction to be gained by the study of Arctic geography; and, we would hope, to recommend it to the attention of our readers. Narratives of polar voyages are not difficult of access; and no more attractive study can be devised for the occupation of a winter's evening, or for the subject of an occasional lecture by the schoolmaster, aided by the map of the Arctic regions, to an intelligent class of pupils, than their pages afford.

We have referred only to the physical characteristics of the scene; but, did our space admit of it, we might dwell upon its moral aspect also. We might point attention to the high order of courage that has been exhibited, on so many trying occasions, by our fellow-countrymen who have been imprisoned in the Arctic wilderness; to the uncomplaining and even cheerful spirit in which almost incredible sufferings and privations have been endured; and to that firm reliance upon the power and the mercy of a protecting Providence which has been uniformly manifested by those engaged in such undertakings. "God, who is stronger than either rocks, ice, eddy, or steam, preserved us and our ships," wrote one of the brave Arctic discoverers of an older date:* and the same spirit is abundantly evinced amidst the perils that have environed the explorers of a more recent period. All honour to those who, upon so many occasions, have sacrificed the comforts of home and the society of friends in obedience to the call of duty; and who have adventured into the extremest danger in the bold attempt to carry their country's flag in triumph into regions where no nation's flag had hitherto penetrated! W. H.

A SCHOOLMASTER'S DIFFICULTIES.

Whatever advantages may result from change, so rarely can any be introduced without some accompanying drawback, that it should surprise no one if the changes which have of late taken place in the conduct of education have been productive of benefits not wholly exempt from some attendant evils. It is, moreover, obvious that those who are most intimately concerned in carrying out any change are more likely to be affected by the difficulties that accompany it than those for whose benefit the change itself may have been made. Hence it is only according to the ordinary course of events, that whilst the advantages of the improved and still improving system of education are very generally acknowledged, the new class of difficulties that have sprung up with it have been little felt or noticed by any save schoolmasters and schoolmistresses, and those in immediate connection with them, such as inspectors and managers of schools. And although the good of many should ever be regarded as an ample compensation for the inconvenience of a few, even by the sufferers themselves, still it is but bare justice to the latter, and what they may fairly expect, to endeavour to reconcile them to their lot by friendly encouragement and sympathy, and by diminishing, as far as possible, the difficulties of their position. Such an attempt has been made, in a very Christian spirit and with considerable success, by an anonymous writer in a small work * recently published, and dedicated to the masters and mistresses of Parochial, National, British, and Infant schools. It is written with an especial reference to those difficulties which are felt under our present transition state, and which may, in some respects, be considered as peculiar to it. The subject is of so much importance, that we propose to call the attention of our readers to the general purport of the book, but our limits will compel us to refer them to its pages for details.

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* Bylot, in 1615.

The difficulties of the schoolmaster are considered in regard to his calling, in relation to himself, as concerning his charge, with reference to committees, with pupil-teachers, touching inspectors, in the matter of society, in prospect of the place, and as affecting personal religion. To each of these heads a chapter is devoted, and, in order to avoid constant repetition of the same words, masters only are spoken of, but many of the remarks made are no less applicable to female teachers.

1. Difficulties in regard to the teacher's calling were little known in times past, when the office was thrust upon some worthless parish clerk, broken-down mechanic, or day-labourer; upon some crippled nurse, sempstress, or laundress, for the sake of keeping them out of the work-house. But the case is very different now, that more commodious and healthy buildings, suitable books and apparatus, and a large staff of far better qualified teachers are to be met with in almost every quarter, and an efficient machinery set a-going to watch over and sustain the whole. Such changes have materially altered both the calling and position of the schoolmaster when compared with those of the last century; some are puffed up, others are humble; some expect too much, their neighbours too little; some are patronised and made saucy, others are soured by neglect; some are helped upward and encouraged, to their own detriment too often, whilst others are scorned and pushed downhill; some are honestly perplexed as to the fitting steps to take, others make no doubt and are foiled, or it may be doubt all and everything. Hence arise disappointments of all kinds, misunderstandings, coldness, opposition, contempt, where peace and good will should abound; and hence many an excellent master, carried away by an undisciplined spirit or chased away by mistaken measures, retires into another calling after years of preparation and expense. Amidst such circumstances, varying often with the changes in the management, it is only natural that any conscientious and reflecting person, in the anxious discharge of his duties, should wish to know better what are really the duties of his calling, what is the true line of demarcation which separates the things within his province from those which are without, and what is something like the level of his position in society.

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* "A Schoolmaster's Difficulties, abroad and at home." (Pp. 229.) London: Longmans. 1853.

Though it would be presumptuous to attempt to give explicit answers to such questions, yet a few plain things may be urged, which may tend to soothe and calm the too sensitive mind, or may suggest a few thoughts of self-discipline and contented submission. As regards the difficulties of his *calling*, it may be granted that many details are left so wholly unsettled that the teacher does not know the full range either of his duties or responsibility; that he may be occasionally checked and buffeted by some over-busy patron or patrons, and that he does not deserve it; that repeated changes, much difference of opinion in the committee, and not a little clashing of the ecclesiastical and political systems may add to his uncertainties as to special teaching, and prevent his always pleasing all that are over him: but what then? Are not these mere trifles, compared with the vast amount of *most intelligible* usefulness which remains? Do they really concern that *subordinate* office which, when he accepted it, he knew was subject to such, and even greater limitations? Are they not altogether out of his province? or, if he think otherwise, still, where is the benefit of letting them fret his spirit and mar his usefulness, when he has such a noble course open to him in so many ways, and such abundant opportunities of teaching fifty, or it may be two hundred, human beings their duty to God and man, and of fitting them for future usefulness; and of lying down, night after night, satisfied that in the main he has tried to discharge with faithfulness his important trust? He may, perhaps, never in this world see the full effect of his toil in his calling; yet, if faithfully and wisely pursued, its end must more or less be gained; and his reward is sure after many days, though as yet it does not appear to the outward eye. And as to *position*, when such a trust is faithfully discharged, this point of inquiry will never be long a matter of doubt or regret. The foolish hankering to be thought and to be a person of some consideration with the little world in which he moves will soon die away in the busy enjoyment of active duties, and in the self-respect of a serious and well-disciplined mind. Every right-minded patron will feel that the master's post is one of honour, and according to his ability will so treat it. The children and parents cannot but accord him much of his due, when they are so largely gainers by his faithful and patient labours. And the inhabitants of a neighbourhood, when they see what was once a crowd of ragged idle children, as rude and untutored as a wild ass's colt, now transformed into cleanly, industrious, well-behaved, and intelligent beings, cannot but gladly welcome such a master among them, and help him up to that position amongst them for which he may have a fitness or claim.

2. As regards a teacher's difficulties in relation to himself, it may be remarked, that no man, probably, ever entered on a new employment, and rightly calculated beforehand its labours, trials, or personal cost to body and mind. It would be vain to attempt here any enumeration of all the sources of difficulty with himself which the schoolmaster may feel for a considerable time after entering upon the due discharge of his duties. All that is contemplated is to offer a few hints, which the thoughtful may work out for their own use. From the many heads of personal difficulties we will select and briefly touch upon three; namely, such as may be termed physical, intellectual, and moral. Under the head of *physical* difficulties may be placed the serious and engrossing nature of the occupation, by which body and mind are more heavily taxed than they ever were before, and which draws upon the good man's

natural frame, so that long before the time for dismissing his flock he has become thoroughly weary, in a way he can hardly account for. Such a state of things should never be allowed to continue day after day, for the body is only a machine—in many cases a far more delicate one than appears—and hence it must be tended and assisted in its toils as other engines are. The sense of weariness and wasting must therefore be met by persevering measures to refresh, for to-morrow's usefulness, what has been injured by the wear-and-tear of to-day. To this end, in the first place, in the school-room itself the *ventilation* should be attended to, and, if bad, improved; towards which much may be done by a judicious management of windows and doors. Again, in the *system* of teaching, care should be taken that more is not pressing upon the teacher, either always or at certain hours, than there need be, and that there be short intervals of comparative repose. If he cannot devise a plan for this himself, he should inquire for some new method whereby he may better divide the labour of the day and distribute his strength. And if his *temper*, as a master, be fidgety about trifles, or over-anxious to have every little matter go exactly according to his wish, he should learn to train himself in habits of calmness upon all such occasions. Out of school, he should also use every means in his power to remedy this distressing weariness, by striving in such seasons of leisure to forget as far as he can his scholastic duties, and by so arranging his affairs as to have as little school-business to do out of school-hours as possible. Some managers are far too thoughtless in giving their teachers writing work, binding, repairing; their female teachers, fixing or cutting-out work, which they expect to be done in those very hours so needful for rest. These over-hours should, in *such cases*, not be encouraged. The teacher should have sufficient walking exercise, especially early in the morning and at the close of his duties; and he should not fancy that he is tired or poorly and cannot walk, for strength and enjoyment will accompany the effort. A proper amount of good and wholesome food is requisite; and cheerful society and amusing conversation must be numbered amongst the best methods to recruit the wasted spirits of the weary teacher, who probably requires them the more in proportion as he shrinks from the exertion they demand.

One of those personal difficulties of the schoolmaster, which may be termed *intellectual*, is that self-conceit to which we are all naturally so prone, and which makes many a teacher look upon himself as vastly wise, until he has found out his level from the examination of an inspector, or from a temporary visit to a training school. If one who has been humbled by such a peep into himself truly desires to remove some of the deficiencies to which he has awakened, almost as from a dream, let him seek advice of the inspector, or endeavour to become a pupil for as long as he can at some training school, or by getting help from some clergyman or master of a neighbouring school, of whom the former will be best able to direct in the choice of books and objects of study, the latter in writing out details. The time for setting about such improvement is at once, without putting it off for a day. But school-hours are not the time, nor when a person is either physically or mentally unfit for it; but in the hours of early morning, or of early evening, or on holidays, which should be partly so employed, taking care, however, that study is not prolonged till energy is gone, or the early hour of rest invaded. In some such way not a few intellectual difficulties may be remedied; but if neglected for a season, use will too often lead to their permanence and increase. The personal difficulties which may be termed moral will be noticed when we speak of those affecting personal religion.

3. With respect to difficulties as concerning his charge, it is not so much any new plans that are wanted as a careful development of those already adopted, with a persevering watchfulness of individual cases. The teacher should look closely and constantly into the details of his own method, and keep his attention awake to a few universally received matters, such as cleanliness, docility, progress, and results. As regards *cleanliness*, without wounding the feelings of the neglected children of misery, or exposing them in any way to the mockery or triumph of their neater fellow-scholars, no opportunity should be lost of encouraging every cleanly habit, and of frowning upon all kinds of foul and disgusting ways. Such personal and plain directions should privately be given as it is known that they can carry out, and where advisable, appeals should be made to their friends. A daily examination into such matters should be made when they enter the school, and care taken that the *out-of-door* arrangements and regulations are such as will foster, not ruin, every decency. In respect of *docility*, some, even under the roughest exterior, are gentle, and may be moulded like wax; others, possibly shy enough to be tolerably well-behaved, have a neck like an iron sinew. But mere natural softness of character must not be mistaken for docility, as this often exists with much mulish resistance of all instruction and discipline, when their unwonted and continued pressure begins to be felt. Neither must it be taken for granted that what appears to be naturally a rugged and hardened spirit is always obstinate and unruly, for many such, who may have had their feelings stifled by the harsh conduct of unnatural parents, yield at once to sympathy and gentle treatment. The teacher should constantly direct his attention and efforts to the formation or encouragement of every degree of docility, and it should be a chief object of his care to acquaint himself with every disposition and temper, every mind and habit, upon which he has to work. It is but of little use to attempt to teach and train by some granite-formed rule, that cannot bend to the thousand-and-one varieties of character to be found among the poor, as much as in any other class. As to *progress*, it should be remembered, that there is no such thing as being "at a stand-still" in school-work. Not to advance is to go back. If the scholars have not advanced in intelligence and character during the past month, then are they a month worse than they were. Such stagnation, therefore, is incipient decay, which must be watched against and resolutely met. If the whole machine is well constructed and kept properly going, its effectiveness will be surely seen, if not by the teacher, at least by the visitor or inspector when looking into results. Where a definite mark of progress is laid down for the whole institution, be it in books, in the general routine of work, or in conduct and character, it is easily detected how near to the mark the advance has actually gone; and even where the aim has been too high for complete success, far more will have been gained than by such as aim low, or have no aim at all. *Results* are generally living evidences of the skill and success of a master's labours, or else the contrary; and to them all practical men engaged in promoting the real education of the humbler classes cannot but look, though often, perhaps, they do not make sufficient allowance for difficulties. Results, moreover, there are of every school, and of every educational

system, balance the account as you will; and that master is truly a wise man, and in the way to guard against future failures, who watches these results with a jealous eye, and compares them with former anticipations. If he has been diligent and faithful, all have gained something; all must in some degree have profited, socially or intellectually, morally or religiously, however short their school-career may have been; all have heard the way to be wise and good, and all, for aught man can tell, have carried away that which may yet spring up into light and life. The end is not always to be seen here; duties and opportunities are ours, results are God's.

4. In speaking of the teacher's difficulties about committees, the term is adopted merely to distinguish the ruling power of a school, and it is sufficient for the purpose of any observations here offered that the establishment is so managed by a governing body independent of the master. When there is a substantial and effective management, however formed, all the teacher has to do in the matter is honestly and consistently to regard it. He is their instrument to work with, their servant to carry out their plans and wishes, and their almoner to bestow what is better than gold and silver; namely, a good education. It is, however, notorious to every practical friend of education, that, some how or other, difficulties do spring up between committees and masters, and of a serious and lasting sort, from causes one would little suspect. These *causes* are not all on one side, any more than of one kind. The writer, after noticing some of the hindrances, difficulties, and provocations on the side of committees, adds, " The fact is, whatever may be the peculiar and, if you will, the absurd opinions on certain points of any committee, or portion of it, they exhibit vastly more excellencies." After all that may be said about trustees and managers, with their crotchets and inexperience and overbearing, it is a fact, that in the great majority of cases and in the first instance, the cause of such unseemly divisions and difficulties with their superiors spring from the masters themselves. They forget that they are the employed, not the employer; and that, whatever be their estimate of their own talents and eminence, they are bound by every consideration of truth and equity to submit, even where they do not like it, to everything that is not sinful, or unlawful, or contrary to their agreement. Masters are not accountable for the decisions of committees, who are really the responsible parties both to the parents and before the world, for the course they adopt; though the masters may be the instruments they use. Instead of provoking such evils, the great object of the teacher should be their prevention, by resolving to have no bickerings or differences with his employers, especially on doubtful and indifferent points. and in matters which are more in their province than his own. Where the difficulties are such as to have reached a certain extent of still increasing evil, the only cure is separation. In such a case the master should, for the sake of all, lose no time, but seek another and a distant sphere of duty, where he may profit in many ways by past failures. If, on the other hand, reconciliation should not be hopeless, the teacher should begin resolutely to retrace every step that was wrong, to admit candidly where he was in error, to withdraw every undue or impertinent or equivocal claim, and to correct privately whatever impressions his pride or self-will may have made upon any of the committee, by such an explanation of his present hopes and endeavours as, without any appearance of servility, will only raise him in their esteem.

It may be a work of time, as well as a trial of forbearance and sincerity, and perhaps some traces of coldness, reserve, and want of sympathy may still be left; but let him be content to have all the main difficulties in the way of peace and active usefulness thus happily removed.

5. The difficulties with pupil-teachers is a matter which concerns comparatively few masters, owing to the small number of schools in which as yet they have been introduced. Their introduction, though it may on the one hand have considerably lessened the master's drudgery, has much added to his difficulties and responsibility. One difficulty arises from the children to be chosen to the new office, who, as a whole, are not a good stock for the purpose, being the relics of old systems, or no-systems, under which they have often grown up ill-taught and ill-trained for their important task. Another difficulty has too commonly arisen from the masters being called upon to exercise new duties and powers, for which, in their turn likewise, they were mostly ill-prepared; in some cases wholly untaught, except in a few most common things, hastily got up to qualify them for their new position; in other cases most insufficient as teachers, save of the very elements, and being too often themselves undisciplined, but little likely to discipline others; and in all cases inexperienced to use these new instruments. These difficulties, however, are not likely to do much mischief where sound prudence, determined industry, and integrity of principle, guide the master. Before a manly teaching and training of himself much of his own unfitness for this new work will rapidly disappear. And, in like manner, he will find the difficulties connected with pupil-teachers mainly vanish, in proportion as he keeps his attention fixed on properly employing, teaching, and training them. Their usefulness and due employment will require his constant consideration. He should try to interest them in every portion of their common work, and to make them feel themselves fellow-labourers with himself in a noble and good cause. He should give them definite duties to accomplish which he knows they comprehend and are equal to; and he should see, not only that they are at work, but interested in their work, and benefiting the school by it. If they have no end in view but to get money, no goal to aim at but the completion of their term, nobody to care for but the master and inspector, what else must be looked for than their turning out mere selfish, mechanical hirelings? Their acquirements also demand a master's impartial and watchful attention, if he would avoid many difficulties in connection with them. They have many temptations to be somewhat puffed up in their own conceit. But if from the very first they be thoroughly humble, without unduly breaking their spirit; if they be convinced of their own ignorance and manifold wants; if they be made to feel that they have nothing in the least to be vain of; and that it must be their own industry and self-discipline, as well as their own actual acquirements, which will decide their usefulness and success in life; and if also kind and suitable help be afforded them where they are deficient; then a goodly promise of modesty, intelligence, and studious labour will soon appear. Their conduct and character form another important source of careful watchfulness, with every master who in any way realizes the difficulties of his position as the responsible instructor of this new class of assistants. For, unless attention be bestowed upon their moral conduct and upon the formation of their religious character, they may have gone backward in good things as to their secret disposition and character, and further

and further from practical godliness, whilst they have attained to great intelligence and usefulness, so far as their outward conduct is concerned.

6. However numerous may be the advantages derivable from the visits of the *inspector*, there is no doubt that they are a fertile source of difficulties with many teachers in our elementary schools. But where the teachers are really sincere and laborious, earnestly desiring to discharge their duties, as well as to improve themselves and the schools, however deficient both may be; there the inspector should be regarded in the light of an experienced friend, who is able and willing to direct them in the right way. Most of the difficulties such persons feel are very often fanciful, or relate to matters out of the master's province; or else they are the necessary consequences of superior tact and knowledge being brought to bear upon the matter—the necessary consequences of that discipline which, whilst it raises the character both of the school and teacher, is often felt by the latter as a humiliating, vexatious, and confusing pressure. The best way to get rid of such difficulties is, when the mind has recovered its balance and the irritation caused by the visit has passed away, to take advantage of every lesson that has been given, to improve in knowledge, skill, and usefulness. When a teacher has not enjoyed the advantages of a training school, but, after having been perhaps for years in some other calling, has qualified himself in his years of discretion for the post of schoolmaster by learning a little more arithmetic, and to write a better hand, and has been appointed to his important post without either experience or real fitness, and is himself indifferent to his faults and deficiencies, or unaware of them, the inspector cannot but differ in opinion from him, and that, it may be, upon almost every important point of teaching and discipline. He may give him advice and directions the very opposite of the master's notions and habits, and subversive of his plans, as well as fraught with a large increase of labour and responsibility. Under such circumstances, the wise course to pursue is thankfully and cheerfully to listen to such opinions and recommendations, however opposite to past usages and present notions, confidently to trust a wiser and more practised mind than his own, and to set manfully about the work of reformation and self-instruction. Very prudent advice is given by an author upon the case of discordant opinions and directions between the managers and the inspector, but for this we must refer our readers to his pages as too special for this general notice.

Under the head of the inspector's examination of the school, a host of difficulties might be gathered. But the fact is, both managers and teachers are apt to expect sometimes too much, at others too little, from the inspector. He cannot by his long-looked-for visit at once transmute a bad school into a good one, or make up by any nostrum or device for the neglect of years. But those who foolishly indulge any such expectation are greatly disappointed to find only the old story, about good systems and instruments, liberality in expenditure, perseverance, painstaking, and a zealous co-operation of all parties. In other cases, perhaps, too little is looked for from the inspector, and the state of things which his examination discloses, as well as his judgment upon them, occasions much disappointment. But it should be remembered that the inspector is but a mortal and cannot work miracles, and that his duty is to try to find out the true character of the school, and the cause of its present condition, and to do what good he can by his visit. Nothing but *realities* can satisfy him. He should see everything connected with the institution just as it may be seen every day. The only preparation for his visit should be that of collecting all the scholars in cleanliness and good order, all books and apparatus being ready for use at a moment's notice, and punctual attention paid to every request he may happen to make in the notice of his visit. When he comes, care should be taken not to waste his time by bad arrangements, or trumpery explanations, or impediments to his proceedings in any way. The master should gain from him as much practical wisdom, help, and experience as he can, and, if permitted, confer with him privately upon the wants, and defects, and failures, of which he is conscious, and learn, if possible, in what particulars, and how (so far as he himself is concerned) the future usefulness of the school may be increased. And if the master act in this spirit, he will not only find all the professed difficulties of inspectorial visits ended, but they will bring to him personally on every recurrence new and lasting advantages. For some account of the difficulties occasioned to the masters by the inspector's yearly examination of the pupil-teachers, and of the master himself, when he has not obtained a certificate of merit, and for our author's advice respecting them, our readers must refer to his work.

7. The difficulties of the master in the matter of *society* need not be noticed here at any length, but they must not be altogether omitted. Whatever be his talents or worth, or his place in the scale of his calling, the schoolmaster is far too frequently almost one alone. No doubt there are numerous cases where he is hail-fellow-well-met with nearly every neighbour, but this often to the cost of his principles or character, his usefulness or consistency. It is usually a rare thing to see the good man with a companion, or to hear of his having any friend with him, except now and then from some far distant spot. It is almost an event in his life to be kindly asked out to dinner, or even invited to tea, by any of his decent and well-to-do neighbours, and you do not find that he visits them or is visited by them. And yet, possibly, he may have been for some years in his situation, be personally well known to a dozen gentlemen besides the minister of the place, and respected as an active, useful, and good master by the inhabitants generally, and still without one intimate acquaintance or friend within miles of him. There can be no question about this being a sad and depressing state of things; but, however common it may be, there is surely no necessity for its long continuance. One of its foremost causes is the position and calling of the master. He cannot well associate comfortably or consistently with the parents of his scholars, who, generally speaking, are very low people; whose habits, ways, and thoughts, are often most repugnant to his. The smaller tradespeople, little farmers, and such like, are afraid of his critical eye and superior information. The better sort of farmers and tradespeople are sometimes subscribers to the school, or, if not, their servants' children go there; and hence the folks at the school are not considered fitting company for respectable people. Such people as agents, bailiffs, surveyors, revenue-officers, and other small "professional" men of the neighbourhood, seem to think the master an interloper, and suspect him as a candidate for any stray job that may be going, and so fight shy of him, lest he should discover in their society the

fallacy of their scientific pretensions. The managers, also, as a body, are apt to suppose that they are concerned with the master only as a teacher, not as a member of the social system. What he does with himself in his leisure hours never enters their minds, and seems to be no business of theirs. And, in addition to these, there are causes which originate with the teacher himself, or at least are encouraged by his want of tact and temper. It may be that he forgets the relative position he still holds in society, notwithstanding the learning which of late he supposes himself to have gained, and that hence he assumes too much, or from some fancy that he has been neglected, cherishes a spirit of independence and pride, and uses no means to invite, and win, and keep acquaintances. Hence, as he retires from others, one after another retires from him, and the miserable loneliness of his position is fixed and hardened by the consciousness that, after all, he has become the victim of his own folly and pride.

If the master could either prevent or remedy these evils of his social position, he should abstain from informing some, or broadly hinting to others, that he does not care about society; that he has abundant resources within himself; or that he had rather be always alone than have such and such sorts of people for his companions. He should meet every advance in a spirit of welcome and candour, especially when he remembers that, as a stranger, he has nothing to lose in the way of kindness and friendship. What the master requires to meet the abovementioned evils is a *cheerful sociality;* but he must take care to avoid, as a matter of course, all that is pot-house, low, and really degrading. He should drop all notions about his being a specially *desirable* acquaintance for any one, and in his social intercourse never forget to lay aside the schoolmaster, else the old habit will stick to him like a bur. His social discussions should be conducted with modesty, gentleness, and peace. He should keep up intercourse with his more immediate associates in the scholastic line, that they may have some chance of mutual benefit. Lastly, he should make himself useful wherever he can—useful on principle, useful in little things, useful to high and low, without ostentation or grudging.

8. The difficulties of the schoolmaster *in prospect of the future* are not perhaps so different from those of other men as they may appear to be to himself, owing to his peculiar position. As regards the decay of the fleshly tabernacle, which he feels and sees, all probably of his years have the same sad tale to tell, and many of them a far worse than his. Nevertheless, each is busily occupied in his accustomed round of toil, and probably will be so for many years to come. This therefore must be patiently borne, as must also the gradual decay of the mental powers and energies with advancing years. He must not expect to be exempted from the ordinary decline of intellectual vigour. If he is still able to do all that is required of him, though at greater cost, if nothing is neglected or shuffled over, if his employers are satisfied, and if they feel that what he has lost in adroitness and energy he has more than gained in experience and piety, he may leave to-morrow to provide for its own, whilst he cheerfully and earnestly goes through the appointed tasks of the passing hour. As to the future of *resources,* it most frequently happens that the teacher has nothing at all to depend upon but his stipend, and that is barely sufficient to meet his expenses. It is therefore natural for him, in advanced years, to begin to feel some anxiety on this head. He should take advice with any who are able to help him, at

once enrol himself a member of some insurance or friendly society, or take advantage of the facilities offered by Government for securing an annuity, or a superannuation allowance, however small. Should this be impracticable, he should try to invest some little sum every month in the savings' bank, and at least avoid everything in the shape of debt, have no old scores, and never anticipate his income. Let him try to believe that in the upright discharge of his duty his post will be his as long as he needs it, that his old friends will never see him want, and that, whatever they may do, He never will give him up who has bidden us not to be anxious about such things.

9. Difficulties respecting temporal matters are not the only ones in regard to the future. There are also those connected with the future of responsibility, and which may be classed with those affecting *personal religion*. Though the main difficulties here are rather in the teacher himself than in any thing externally about him, yet there are not a few connected with his scholastic work, which, if not met in a spirit of watchful piety, will prove unfavourable to personal religion. Such are the constant mixture of sacred and secular almost in the same breath, the reading of the Bible or of scriptural subjects without due thoughtfulness, the constant repetition of hymns in a dry and unfeeling way, the careless and irreverent rehearsal of catechisms, the attending a place of worship on Sundays with the scholars whilst the eyes and ears are every where but within his own bosom or with God—all such things interfere with the teacher as a devout and spiritual worshipper, and tend to blunt his desire for and his enjoyment of religious exercises. Under such circumstances it is plain that he stands in especial need of perseveringly and devoutly using all the means of grace, if he would seek to practise true personal religion. As this increases in strength and hope, the remembrance of what God has done for his own soul will urge him to labour with greater devotedness so to train and discipline his little band, that in the life-long struggle between evil principles and evil powers on one side, and the good on the other, they may fight manfully under Christ's banner, and at length be more than conquerors through Him that hath loved them.

Such is a general sketch of our author's view of a schoolmaster's difficulties, and of the spirit and manner in which they should be met. Those teachers who are perplexed or depressed by any which he has enumerated, will do well to have recourse to his pages, from the thoughts and suggestions contained in which they can scarcely fail of deriving profit. Even these who lack resolution or energy to adopt the remedies he has proposed, may nevertheless gain consolation and encouragement from the sympathy and consideration which he has expressed for them. The book being dedicated to masters and mistresses of schools of all religious denominations, no special reference is made in it to the teaching of the Church. Silence upon any subject has so much the appearance of indifference to it, that in this case it has naturally the effect upon churchmen of appearing to undervalue the importance of the Church's teaching as a part of education. But the volume may be safely recommended to Church schoolmasters, if they will bear this deficiency in mind, and make due allowance for it. The religious school to which the author himself inclines is sufficiently indicated by the fact, that the only writers on religious subjects whose names he mentions are Wilberforce, Serle, Venn, and Doddridge.

PRINCIPLES OF ASTRONOMY. No. 2.

THE SEASONS.

Before entering upon the explanation of the cause which produces the alternation of spring, summer, autumn, and winter, with the various gradations whereby they blend insensibly into one another, it may be well to explain a few of the laws of heat—the great agent in producing the phenomena about to come under our consideration.

The heat received by the earth's surface is derived wholly from the sun. His rays are absorbed to a certain depth, which is, however, very inconsiderable; a thermometer, at no great depth below the soil, would be beyond the influences which affect the surface. At the Observatory of Paris one has been stationed, for the last 70 years, 91 feet below the foundation of the building, which has indicated an invariable temperature of 53°—two degrees higher than the mean annual temperature of the air above.

The different kinds of materials composing the earth's surface have different absorbing powers: that is, are better or worse conductors of heat; others reflect heat more powerfully, while all radiate forth the heat received into the surrounding air. Apart from the influence of radiation and reflection, a thermometer suspended in the air, exposed to the unobstructed rays of the sun, would not read so many degrees higher than another in the shade. I find, that at Greenwich Observatory, October 18th, the maximum heat in the shade was 55·2°, in the sun 63·8°: had the thermometer on which the sun shone been placed against a wall, the difference would have been much greater.

It is invariably found that places on the sea-coast have a less variable temperature than those inland. This difference is owing to the oceanic currents, whereby there is kept up a constant circulation of immense masses of water, from the tropical regions to higher latitudes and back again: thus we find the gulf-stream flowing from the Gulf of Mexico, with an initial temperature of 84°, along the coast of North America, and downward on its return course by the shores of Europe and Africa. Water has a great capacity for heat and parts with it slowly, it is true; communicating warmth however to the air above, and thus tempering the cold of the winter months.

In the summer the evaporation is considerable; and as this is always a cooling process, the temperature of the air is thereby much reduced. The heating or cooling of the water proceeds very deliberately, and the air above partakes, in a measure, of the uniformity of temperature which belongs to the surface of the ocean: thus the extremes of temperature are much less with places near the ocean than with those at a distance from it. An illustration taken from two places in the same latitude, but one on the sea-coast the other inland—Penzance, and Barnaul at the foot of the Altai in Siberia—will tend to impress the mind with the truths here brought forward.

	Winter temperature.	Summer temperature.	Difference.
Penzance	44·6	60·4	15·8
Barnaul	6·6	61·9	55·3

It will be seen, then, that climate depends not solely on the position of a place regarded astronomically—that is, taking into account its distance from the equator; but that other causes, the full investigation of which constitutes the science of meteorology, combine to modify the heat which the sun imparts. In the explanation of the seasons which follows, I can only refer to the changes regarded astronomically, or lay down general principles, which would hold good universally were they not counteracted by opposing influences. We might even conclude that every place on the earth's surface is subject to certain local influences, which tend to produce a temperature different from what would be assigned to it, if we remarked only its remoteness from the central division of the globe.

The sun and earth are connected by the attraction of gravity as certainly and forcibly as though they were united by an adamantine chain: this force would draw them together and produce a collision, were it not nicely balanced by a centrifugal tendency. The direction of the line of attraction is from centre to centre of the earth and sun; the line joining these points is termed the *radius vector*. As the earth sweeps round in her annual course, the radius vector will mark out a plane which will be that of the earth's orbit; since this passes through the earth's centre it will divide the earth into two hemispheres; another plane, at right angles to it, passing also through the earth's centre, will be the boundary of light and darkness—of day and night. This boundary will not always pass through the poles, inasmuch as the inclination of the earth's axis from a perpendicular to her orbit will, as its parallelism is always kept, cause at one time the north pole and at another the south to be directed towards the sun; so that it may and does happen that, for many revolutions of the earth on its axis, places in the neighbourhood of either pole do not lose sight of the sun, while those near the opposite pole do not see him at all for the same period; the limit of these phenomena will be two circles, 23½° from the poles.

Since the equator is at right angles to the axis, the equator will form, with the orbit, an angle of 23½ degrees; as the planes of both these circles pass through the earth's centre the two planes will intersect each other, the line of intersection passing through that centre. Suppose the plane of the earth's orbit indefinitely produced, it will be projected as a circle among the fixed stars; which circle will cut the projection of the earth's equator in the heavens in two points, termed, for reasons we shall presently explain, the *equinoctial points*. The orbit of the earth thus described among the fixed stars is termed the ecliptic; and the stars which border it on either side, to the extent of 8 degrees, have been from time immemorial divided into twelve Constellations, which are termed the signs of the Zodiac. The place of the sun will be always in one of these; and, making use of the unphilosophical, but usual and convenient mode of expression to which allusion has before been made, we say the sun enters such a sign at a particular time of the year. We must however determine a starting point; and this has been done by astronomers in manner which it would have been well if civilians had followed: the civil year commences on the 1st of January, which day is marked by no important astronomical occurrence; the astronomical year commences on the 21st of March, on which day the sun is at one of those points where the equator and ecliptic intersect: the distance of the sun from this point, which is the first point of Aries, measured in degrees on the ecliptic, is termed his *longitude;* which, when he crosses the equator again, will have increased to 180 degrees; when he arrives again at the first of Aries, to 360 degrees.

The distance of the sun from the first point of Aries, reckoned on the equator instead of the ecliptic, is called his *right ascension*, It will be evident that, at two points between these intersections, the sun will have arrived at his extreme distance from the equator; which, as its angle of inclination with the ecliptic is 23½ degrees, will amount to that quantity: in every intermediate position his distance from the equator will vary from 0 degrees to 23½ degrees, and to this distance astronomers have applied the term *declination.*

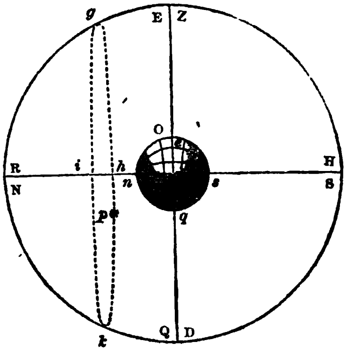
The use of these technical terms in the study of astronomy cannot be avoided, as they are of constant occurrence in every almanac and in every treatise on the subject; nor would anything be gained by rejecting them. Too frequently, however, their exact import is not understood, and hence the desirableness of obtaining a clear conception of the astronomical facts they are intended to indicate: in the following papers they will hereafter be generally used to prevent circumlocution, and to harmonize this treatise with the scientific nomenclature in general use.

We may regard the ecliptic and equator as having a fixed and definite position in the heavens: to connect the horizon with these circles we must imagine a plane 90° every way distant from the observer's zenith also passing through the earth's centre, but constantly varying its position as he is carried round by the rotation of the earth—the plane of this circle produced to the celestial concave will divide it into the visible and invisible heavens, which will vary from moment to moment, producing the phenomena of the rising and setting of the heavenly bodies. As the meridian is a circle at right angles to the horizon, passing through the north and south points, it will also be in constant motion, being, as it were, carried along with the horizon in its diurnal course: as this arrives opposite a heavenly body it is said to be on the meridian; mid-day occurs when it is opposite to the sun.

Resuming the subject of "the sphere," we shall proceed, as illustrative of the seasons, to explain what is meant by right, parallel, and oblique spheres.

Every reader of arctic travel has been struck with the length of the days which visitors to the northern regions have experienced; equally so with their long, dreary nights. Tropical regions moreover, we are told, lose sight of the sun at six or seven o'clock in the evening throughout the entire year: a little attention to the principles about to be enunciated will be repaid by a full and clear comprehension of the cause of this variety in the length of the duration of a solar day.

It was established in a former paper that the elevation of the pole of the heavens above the horizon of an observer was always equal, in degrees, to the latitude of the place of observation. Now, to a person situated on the equator, this elevation will be 0, for his latitude or distance from the equator will be 0. Such a person will have the two poles of the heavens in the horizon occupying the north and south points; the equator will coincide with the prime vertical, and will pass through the zenith: here, and only here, will every constellation in the heavens rise above his horizon every day, and, in the course of the year, be visible to his unassisted vision: the angle formed by the diurnal arc of any heavenly body with the horizon will be a right angle and each will remain above the horizon as long a period as it remains below, for such arc will be bisected by the horizon. This position of the sphere of the heavens is termed a *right sphere*, and may receive illustration from the adjacent figure, in which *n s* are, as before, the poles of the earth; N S the poles of the heavens; E Q

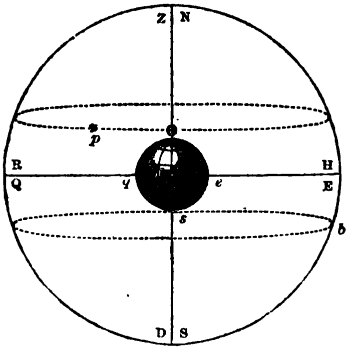


the equator; Z the zenith of the observer at O; H R the horizon, and the primitive circle the meridian: *k i g h* is the diurnal path of a heavenly body which, it will be observed, is bisected by the horizon, the part *i g h* being equal to *i k h*. If we suppose this to be the path of the sun for twenty-four hours when at his greatest northern declination, the arc *g* E will be equal to 23½ degrees. The semicircle *i g h* above the horizon will be described in twelve hours; the other, *i k h*, his path during the night below the horizon, in the same time: the days and nights will therefore be equal; and that, too, whether he describes the circle E Q, which will be his path when on the equator, or whether he ranges on either side of that circle. When the sun is over the equator will occur the hottest period of the year; for he will be vertical at noon, or overhead, when at E, to the observer at O; whereas at other periods his altitude will be less till it diminishes to 66½ degrees, which is the defect from 90 degrees of the arc E*g;* as he returns to the equator the arc *g* R increases; after crossing it, his meridian altitude will decrease till it is reduced, from day to day, to 66½ degrees, measured from the southern point of the horizon H.

The relation between the altitude of the sun and the degree of light and heat received by any given portion of the earth's surface, will be immediately apprehended from the following considerations. If the direction of the rays proceeding from a luminous body be vertical, it is clear that the number and power of the rays received by any illuminated portion of the earth's surface will be at a maximum: take one square foot of that surface, and imagine it to receive a certain number of vertical rays proceeding in a parallel direction from the sun; imagine this presented obliquely to the direction of the rays, the breadth between the limiting rays will evidently be diminished (in mathematical language, as radius to the sine of the angle of inclination from the vertical), and that the more as the inclination is less; the light and heat thus received will therefore be so much the less. Hence the heat at the equator will be the greatest, as far as this cause is concerned, when the sun occupies the zenith, which will occur on the noon of two days in the year, viz., on March 21 and September 21; and will be least on two occasions, viz., June 21 and December 21, when his declination is 23½ degrees; nevertheless, as his meridian altitude is, even then, greater by 4 degrees than with us at midsummer, the temperature will be still very high. We see, then, that at the equator there will be two periods of greatest heat, and on two occasions the heat will be a minimum: as these extremes will not differ very greatly from each other, we can hardly say that two summers and two winters occur during the year, though, strictly speaking, these periods might come under those designations.

The seasons are so modified by the various causes to which allusion was made in the introduction, that the astronomical explanation does not meet all the facts of the case, but only lays down general principles, which would hold good were there no disturbing influences.

Let us now transport our observer to either pole—say the north, as being more convenient; his distance from the equator being 90 degrees, the altitude of the pole will equal that quantity, and the pole, the stationary point of the heavens, will occupy the zenith, or point overhead; the equator and horizon, coinciding throughout, will form one circle when projected in the celestial sphere: it follows that those heavenly bodies situated below the equator never rise above the horizon, and hence the southern constellations will never be visible at the north pole; while the northern constellations will never descend below the horizon, but move round in diurnal arcs all parallel to each other and to the horizon; decreasing, however, in size as they approach the pole, which is in the observer's zenith. From the nature of this movement such a position of the heavens is termed the *parallel sphere.*



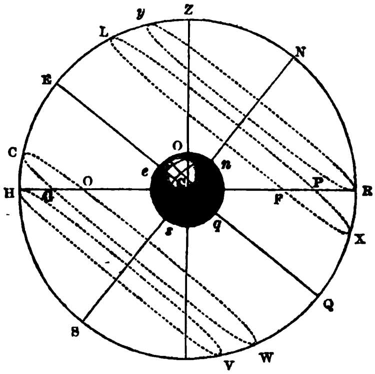
We have seen that the sun ranges during half the year to the north of the equator, having a southern declination during the other half: he crosses the equator on his northern tour on March 21, when he begins to be seen at the north pole, and continues in sight for six months; as he never attains a greater distance from the equator than 23½ degrees, it follows that his altitude above the horizon, even on the noon of June 21, is never more than that quantity; for the greater portion of the summer half-year it is less; and hence his rays, falling very obliquely, communicate but little heat to the polar regions. During the whole of this time the supposed observer will have perpetual day, which will be so far advantageous that the earth has no time, so to speak, to radiate forth the heat received; whereas the nights at the equator being as long as the days, a good portion of the daily heat imbibed from the sun is given off in radiation—in either case the temperature will be modified: the heat in the one case being diminished, and in the other increased, from precisely the same law of nature.

The meridian height of the sun at Midsummer-day at the north pole will be equal to what we in the south of England have it on Feb. 4 and Nov.

6 : when we consider the absorption of his heat in melting the ice of the polar seas, the low temperature even of the arctic summer will not appear wonderful. Though from late accounts we learn that animals abound in the arctic regions, the stunted and degraded forms of the human race would seem to indicate that the appointed boundaries of man's habitation fall short of these very high latitudes; still the daring and enduring enterprize of British sailors has enabled them to advance within 440 miles of the pole, as well as to winter—with a few sad exceptions—in comparative safety amidst fields of solid ice; and a great authority * has pronounced a deliberate opinion "that an efficient screw steam-vessel might, in the proper season of the year, accomplish a voyage from the river Thames to the north pole and back in two or three months," passing between Greenland and Spitzbergen instead of the track hitherto pursued. Referring to the projection of the parallel sphere, we remark that N the pole and Z the zenith coincide, as do E Q the equator and H R the horizon: mark the path of the star *p*, and it will be found to describe, during its diurnal revolution, a circle parallel to the horizon; if this parallel be considered $23\frac{1}{2}$ degrees from the equator, it will point out the diurnal path of the sun on the 21st of June.

As the population of the globe, for the most part, occupies intermediate positions between the two extremes of the equator and the poles, we shall proceed to investigate the peculiar circumstances of those whose latitude is neither 0 nor 90 degrees; these will differ for each latitude, but the conditions of each will be understood by our assuming the latitude of London as the representative of all.

Recalling to mind the principle on which the elevation of the pole was proved to be equal to the latitude, the altitude of N above the horizon, viz., N R, will, in the case of London, be $51\frac{1}{2}$ degrees.



It will be at once seen, by inspecting the figure, that the heavenly bodies rise and set obliquely to the horizon—hence the term *oblique sphere*. Nor will it be difficult to ascertain the angle of inclination formed by the diurnal arcs and the horizon; for, be it remembered, that the diurnal arc of every heavenly body is ever parallel to the equator: suppose a heavenly body to be on the equator, its diurnal arc will be in the line E Q, which line, here the representative of a circle projected edgewise, forms, with the horizon H R, the angle E C H, which is equal to H C Z less the arc E C Z; but E C Z is the latitude of the place and H C Z is 90°: hence the angle of obliquity will always be equal to 90 minus the latitude of the place—in mathematical language to the co-latitude; this angle will be the same whether the heavenly body is above the equator (LFH), or below (CGH).

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* Augustus Peterman.

Let us investigate the varying altitude of the sun arising from its alteration of declination, on which, astronomically speaking, depends the temperature of the seasons of the year, and the length of the day and night.

To begin with the 21st of March: when the sun is on the equator his diurnal path is represented by the line E Q: it will be observed that this is bisected by the horizon H R, the sun will therefore describe one half of this arc, which will occupy him twelve hours, above the horizon in the day-time, the other half during the night—day and night will therefore, at this period, be equal, and again on September 21, when he attains the same position. This will be the case in an oblique sphere, whatever latitude may be assumed.

Again, suppose the sun to have reached, as he will have done on the 21st of June, his extreme northern declination; at noon he will occupy the point L; F will be the point of the horizon where he rises, P the point where he sets: it will be at once seen that the arc F L P, which will be described during the day, will be much greater than the arc F X P, described during the night: thus we account for the long days of summer in this latitude; and since, at this period, the sun's meridian altitude, viz., H L, is the greatest, the heat will be most powerful from this cause, as well as from the shortness of the nights allowing but a small period of time for the earth to radiate into space the heat accumulated during the long summer day.

The circle C G W O will be the sun's diurnal path on the shortest day; the portion C G O above the horizon being due to the day, G W O, a much greater share, to the night. When the sun is thus situated, it will be easily imagined that the circumstances described as constituting the summer will be reversed, less light and heat will be received, and it will be mid-winter to the inhabitants of the north temperate zone. Since the diurnal rotation of the earth is performed round the axis *n s*, and that of the heavens round *n s* produced, viz., N S, it results that all the heavenly bodies included within the circle *y* R will be at all times above the horizon; *i. e.*, they will never set: this is called the circle of perpetual apparition; its distance from the pole, N R, is evidently equal to the elevation of the pole or the latitude of the place of observation.

A little consideration will show that the nearer an observer approaches the pole the more will the position of the sphere of the visible heavens resemble a parallel sphere; on the contrary, when his latitude is low, a resemblance will be seen to the right sphere. In the former case, the length of the days and nights will be extremely unequal, as we find in high latitudes; in the latter, the days and nights will differ in length by a small quantity.

That branch of science called Spherical Trigonometry is employed in calculating, with great accuracy, the various quantities dependent on the position of the sphere; while problems performed by the help of the celestial globe are a rough method of arriving at the same solutions. The instruments used in observatories and in nautical astronomy determine the places of the heavenly bodies by ascertaining their position on one or more of the various circles described: from data supplied by observation and others recorded in astronomical works, results are obtained of the utmost value to science, as well as of extreme practical utility.

It is hoped that the preceding explanation of principles will excite an interest in the pursuit of this branch of astronomy; from no other can be derived more suitable subjects for the exercise of the reasoning faculties, even for those who may not be able, from deficiency of mathematical knowledge, to carry out results to their fullest extent. J. D.

SUPPLEMENTARY MINUTE RELATING TO QUEEN'S SCHOLARS, APPRENTICES, AND CERTIFICATED TEACHERS.

The last minute issued by the Committee of Council on Education contains some of the most important modifications that have emanated from them since the publication of their celebrated minutes of 1846. These alterations are the result of a general reconsideration of the scheme, with special reference to certain complaints brought against the present system. The complaints are five in number, according to the published scheme; but a sixth may be added, which is also met.

1. Certificates are granted without sufficient guarantees for practical ability in teaching, and such ability is not sufficiently rewarded and encouraged.

2. The training schools are maintained inadequately, with difficulty, are not fully occupied, nor always with the class of students best adapted for training.

3. A large proportion of the pupil-teachers who have completed their term of service does not enter the training schools at all.

4. The standard of instruction in training schools might be raised advantageously, with especial reference to the subjects of elementary instruction.

5. No adequate encouragement is offered to prolong the continuance of students under training beyond a single year.

6. Many of the masters of the old school are acting most efficiently in their sphere of labour without being recognised as registered teachers, or allowed to participate in any of the advantages arising from such a classification, because they do not possess that amount of technical knowledge which gives them a title to a certificate of clients.

To remedy the evils arising from the scheme of '46 under the first head, the limitations subsequently imposed upon the admission of pupil-teachers to training institutions are to be removed. Every such institution will in future be allowed to fill up all its vacant places by Queen's scholars. Previously, 25 per cent. only of the students in training could be Queen's scholars, the other 75 were supplied from other sources than the ranks of pupil-teachers. Such an alteration will operate beneficially upon those whose acquirements on examination have proved to be such as to entitle them to an exhibition in a training school, but who could not claim it because the small numbers of vacant places had been already filled by those who had passed a better examination. The study of subjects proper to elementary instruction is to be more fully recognized in training schools, and more systematically promoted. The portion of the scheme, however, which bears most directly upon the complaints of the inequality in the award of certificates is that which declares that no such document will, after the next examination, be granted to a teacher who has not had charge of a school two years, and been reported upon twice by the inspector of the districts.

Whether he is to be entitled to a certificate or not, and of what class, will be determined by the tenor of such reports, and by the results of his examination. Again, the value of the certificate will not be fixed higher at first than the lowest class, unless the student shall have been in a training school at least one year and a half. Candidates for certificates will, after the examination, be classed according to the result; but will not be certificated till the other conditions are fulfilled. At the end of five years the certificate will be open for revision, from time to time, according to the character of the intermediate reports.

The provisions made for the purpose of meeting the second complaint appear to be objectionable, and we fear the operation of them will be injurious to the training institutions. The income which they derive from the fees paid by the students is altogether insufficient to keep them in proper working-order, officered by competent men. They are dependant, to a great extent, upon the grants which have been allowed them by the Committee of Council of 20*l.*, 25*l.*, and 30*l.*, according to the class obtained by their students upon examination after a year's residence. After Christmas, 1853, these grants will only be made in cases where the students have been resident in the institution two years. As the certificate may be obtained after a residence of a year and a half, it may frequently happen that the student will obtain at once some appointment, and thus the institution will be deprived of the grant to which it is fairly entitled

The principals of the institutions may perhaps make it a rule that all students should remain two years, and perhaps such a rule would benefit the institutions by keeping the numbers more even, it might perhaps increase the numbers; it is, however, probable that the addition of a year to the time of probation, before anything could be actually realized by the student, would discourage many from entering; for they are mostly young men, dependant upon patrons, or on friends whose means are limited. We were therefore greatly afraid that the arrangements made, apparently with the intention of benefiting the institutions, will, if carried into effect without modification, seriously injure them.

That there may be no lack of a supply of young men to fill the establishments, a greater number of pupil-teachers is to be allowed to such schools as have been successful nurseries for Queen's scholars; in others, those whose acquirements have fallen short of the standard to secure the scholarship may be placed, without a double reduction of the number of pupil-teachers, as hitherto. Such assistants may after three years' service claim a scholarship without further examination.

To obviate the difficulty named under the third head, in addition to the influence the provisions already named will exercise, the period of apprenticeship will in every case terminate at the same time and but once in the year, corresponding with the date of entering the training establishments. Thus, those who enter upon their term of service during the first half the year, that is, before July, will serve less than five years, but will receive the emoluments for the full time; those who enter in the latter half will serve more than five, but less than five and a half years. Such will receive the last year's rate of payment proportionate to the time of over-service. The examination of candidates for scholarships will be held three days previously to that for certificates, so that no delay will occur, and successful candidates will be able to enter upon their course of training immediately after the general examination. These however are matters of mere detail, and will not have the same amount of influence upon the number of pupil-teachers entering the training institutions as some of the arrangements previously referred to. Numbers, too, of the present class of pupil-teachers have entered upon the work without the idea of becoming teachers; some for the purpose of obtaining an education that will fit them for some other calling; many with the view of accepting the advantages at first offered, of obtaining a situation in the Excise or some other department under Government patronage. This last class however will be disappointed, since the minute that held out that inducement, although not formally rescinded, is not now acted upon.

To meet the complaints against the standard of instruction in elementary subjects, an apparently solid advantage is offered. An augmentation grant of 100*l*. will be made annually to the salary of a resident lecturer in one of the following subjects:—History, English Literature, Geography, Physical Science, or Applied Mathematics. Such a provision will no doubt have a beneficial effect, where it does not require an additional officer to be appointed. To increase the standard of instruction, also, it is provided that in future drawing, as taught in the Department of Science and Art, shall be an important part of the examination for a certificate.

Such, then, is an outline of the modifications lately introduced into the minutes, professedly with the object of securing an increased number of certificated teachers in elementary schools. It is allowed, however, that there must still remain a considerable number of teachers *disqualified by age* for passing the examination for certificates, as well as a number of schools not in a position to obtain certificated teachers. It is therefore proposed to institute a class of registered as distinguished from certificated teachers. An examination will be held, similar to the late Easter Examinations, at convenient places throughout the country, some time in '54, to be continued annually. After an ordeal of three days' duration the candidates will be passed, or rejected and not classed, as in the case of the certificate. Simple questions only will be given, and the subjects will be limited to the Holy Scriptures, the Catechism, and the Liturgy of the Church of England; English History; Geography; Arithmetic (including fractions, vulgar and decimal); English Grammar and Composition; the Theory and Practice of Teaching. No teacher will be admited to these examinations who has not completed his or her thirty-fifth year. Unfortunately, for such as come into this class, none of the certificate gratuities will fall to them. It is to be an honorary distinction, but one that must be possessed by all who undertake to train pupil-teachers. This is a step in the right direction; but while so much is professedly being done to benefit other classes of teachers, those who are disqualified by the length of their term of service ought to be able to look for something more substantial than honorary distinction.

Notices of Books.

1. MANUAL OF ASTRONOMY: A POPULAR TREATISE ON DESCRIPTIVE, PHYSICAL, AND PRACTICAL ASTRONOMY; WITH A FAMILIAR EXPLANATION OF ASTRONOMICAL INSTRUMENTS AND THE BEST METHODS OF USING THEM. BY J. DREW, PH.D., F.R.A.S. SECOND EDITION. (London: *George Bell.*)
2. AN ELEMENTARY TREATISE ON PLANE CO-ORDINATE GEOMETRY. BY REV. W. SCOTT, M.A., MATHEMATICAL LECTURER, AND LATE FELLOW OF SIDNEY SUSSEX COLLEGE, CAMBRIDGE. (Cambridge: *John Deighton.* London: *George Bell*).

ASTRONOMY has been a favourite study from the earliest ages; but its true principles have been generally received, and satisfactorily explained, only in very recent times. The discovery of the law of gravitation by the illustrious Newton laid the foundation of the sublime science of astronomy, and the researches of Laplace and others have thrown much additional light on the various phenomena of the universe.

In Dr. Drew's "Manual of Astronomy," which is princially addressed to a class of readers not conversant with the more severe and scientific reasoning of the higher mathematics, being intended for those who know little or nothing of the subject when they commence its perusal, the principles of the science are deduced from observation, as far as they can be without mathematical investigation, and its general outlines are very clearly and intelligibly stated without introducing any complex scientific formulæ. As a science, the truths of astronomy can only be adequately established on mathematical principles, but still they are capable of explanation without recourse to mathematical researches, in so far as the fundamental observations and principles admit of being stated clearly in ordinary language, and serve as the basis of much reasoning and discussion of a popular character.

Dr. Drew's Manual consists of three parts: viz., *Descriptive Astronomy*, *Physical Astronomy*, and *Practical Astronomy*.

Part I. treats "on the number, magnitude, and physical constitution of the heavenly bodies, and brings down the modern discoveries in astronomy to the present year." This part of the work consists of thirteen sections spread over 136 pages, and the descriptions of the several bodies of the solar system are conveyed in a clear and intelligible manner, evincing an accurate knowledge of the subjects embraced in these sections of the work. The discussions on the superior and inferior planets, on the eclipses of the sun and moon, and on the tides of the ocean, are very interesting, and show that the author has a thorough knowledge of the popular explanations of the remarkable phenomena of the tides and eclipses of the heavenly bodies. It is almost needless to remark that here, as in every part of the book, the descriptions of the various phenomena are well illustrated by plates and diagrams. A list of all the minor planets, or asteroids, which have recently been discovered between the orbits of Mars and Jupiter by Mr. Hind, De Gasparis, and some other continental astronomers, is given in the eleventh section; but since the publication of the work several other minor planets have been detected and added to the solar system.

Part II. is "an attempt to simplify the elementary principles of the Newtonian Philosophy." This most valuable part of the science of astronomy occupies only about 43 pages of the volume, and it is only a very slight idea of a subject so extensive and intricate, as physical astronomy necessarily is, that can be given in such narrow limits. The author's "efforts have been directed to such an exposition of those wonderful secrets of nature, which Sir Isaac Newton was the first to unfold, as will enable the student to appreciate the labours of that profound philosopher, and to estimate justly the benefits which science has derived from him."

Part III. "gives an explanation of the manner in which the facts brought forward in the former sections may be verified by the use of astronomical instruments; directs such as may possess telescopes how to use them, what objects to look for in the heavens, and where they are to be found." In this valuable part of the book, which occupies 121 pages, there is much practical information, conveyed in a very perspicuous manner. The mode of rectifying the transit instrument and placing it in the plane of the meridian, the use of the altazimuth circle, and the equatorial, are succinctly described; and the solution of some useful problems in astronomy are given in detail. As the author has been for several years engaged in astronomical pursuits, his practical knowledge gives an interest to this subject which it would not otherwise possess. The account of his own observatory, and the adjustment of the instruments with which it is furnished, will be read with interest.

On the whole, Dr. Drew's "Manual" does him great credit; the descriptions throughout the volume are easily understood, and the investigations which he has occasionally introduced are as simple and intelligible as the subject admits of, requiring only a slight knowledge of plane and spherical trigonometry. It is a popular rather than a scientific work, and as such it will be found both entertaining and instructive.

"The aim of Mr. Scott's 'Elementary Treatise on Plane Co-ordinate Geometry' is to place before the student, in a brief yet comprehensive form, the principal methods employed in the science, with their application, for the most part though not exclusively, to curves of the second order."

This is a neat little treatise, consisting of the ordinary investigations respecting straight lines and curves of the second order, or the conic sections. The discussions in the first three chapters relate to the various forms and interpretation of equations of the first order, with their application to problems on right lines and to the determination of loci. The reduction of equations by transformation forms the subject of the fourth chapter, and the equations and properties of curves of the second order are very elegantly investigated in the six succeeding ones. The subject of the eleventh, or concluding chapter, is also judiciously treated; and the discussion on the best and neatest general forms of the equations of curves of the second order is very interesting, and merits an attentive perusal. The volume concludes with an appropriate selection of examples on each chapter, in illustration of the principles therein developed.

Mr. Scott has given an excellent exposition of the principles of plane co-ordinate geometry, as applied to straight lines and curves of the second order. It has been usual in works of this class to give the equations of the circle, and some of the lines connected with it, in a separate form; but though the author has not adhered to this plan, he has not omitted to give the requisite information respecting the circle in various parts of the volume (see pages 53, 73, 74, 80—88). The methods of abridged notation, which are now so successfully employed by recent writers on co-ordinate geometry, have not been overlooked by the author; and as the volume contains the leading principles of this useful science, deduced in a very perspicuous manner, we have much pleasure in recommending it to undergraduate students, and others who have not the requisite time to devote to the study of more elaborate treatises, and works of higher pretensions.

NIEBUHR'S LECTURES ON ANCIENT ETHNOGRAPHY AND GEOGRAPHY. EDITED BY DR. SCHMITZ. 2 vols. 8vo. (London: *Walton & Maberly.*)

WHATEVER Niebuhr wrote or said on the subject of history or its kindred departments of learning, is worthy of the closest and most respectful attention. The author who gave to the world a History of Rome so remarkable for talent and luminous clearsightedness can be no ordinary writer on any topic he selects, and the learned world gladly hail the production of other works from the same accomplished scholar.

The present work contains the substance of lectures delivered by the great historian in the University of Bonn during the winter of 1827-28, and were originally published at Berlin, two or three years ago, from the manuscript notes of those who attended the professor's lectures. They are now given to the English public by Dr. Schmitz, the compiler of Niebuhr's "Lectures on Ancient History," not in the form of lectures, for no such division, the editor informs us, existed in the German of Dr. Isler, but as a continuous treatise, only split up into portions by the natural divisions of the subject matter.

This work, then, is the substance of Niebuhr's lectures, as above described, on Ancient Ethnography and Geography. The exact sphere the lecturer worked out for his remarks he fixes in the introductory chapter. He does not profess to treat of all the nations of antiquity, but he regards the subject from a classical point of view. Greece and Italy form the staple of his lectures, and those nations which are more or less connected with them by literature or history. Of the East and Africa he speaks only so far as they came within the reach of these two classical nations; all others he passes over. And, with reference to Bactria and India, he follows not the native authorities, but the accounts furnished by the Greeks. Before entering on the real subject of these lectures, Niebuhr gives an exceedingly interesting account of the rise and progress of the chorography of Greece and Italy, with an analysis of the geographical works of the ancients, and a view of the different theories existing with respect to the form of the earth down from the Homeric period. He then proceeds to discuss Greece ethnologically and geographically. First, he takes the country in the mass, and describes its physical features and peculiarities, in the way of rivers, mountains, valleys, and coasts, beginning with the Peloponnese, as the purest Greek country, and as possessing supremacy over the other districts for ages.

Taking the divisions of the Peloponnese, beginning with Argolis, he gives an excellent account of the physical structure of each division:

then a list of the chief towns in the district is presented, with notices of their sites, descriptions of ancient buildings still existing in the vicinity; and all along there is a flood of collateral information and illustrations of ancient events by comparison with similar circumstances of more recent date, and explanations of numberless allusions or phrases occurring in the classical writers. From the Peloponnese he proceeds northward, and after treating of Attica, generally briefly, makes a long pause at Athens.

Since Niebuhr's lectures more recent investigations have been pursued; and therefore, occasionally, points he leaves as undetermined have been subsequently fixed satisfactorily. After proceeding through Thessaly, Bœotia, &c.; the adjoining islands, Eubœa, Crete, Rhodes, and the groups of the Egæan Sea; Ionia, Thrace, and Macedon, are similarly discussed. This concludes the first volume. In the second, the subject is mainly Italy. Here we find an account of its original inhabitants, its different races, its Opiican, Italian, and Sabellian features; the displacements of its various tribes; the natural divisions of the country. Then, beginning with a more particular description, he passes on to the topography of Rome. This occupies a considerable portion of the second volume. And, from Niebuhr's long residence in Italy,. his views and descriptions are unusually lucid and decided. After traversing the other districts of Italy, Etruria is touched upon, and interesting disquisitions on its races and language given. Then the other portions of Europe follow, Spain, Gaul, the Belgæ, and others; and, lastly, those portions of Africa which belong to the classical period. The whole work presents a mass of information, valuable if account be taken only of the vast amount of geographical knowledge contained in it, but invaluable if we take into account also the great display of classical learning it presents for our information.

HORATII OPERA: WITH ENGLISH NOTES. BY THE REV. A. J. MACLEANE. ABRIDGED FROM THE LARGER EDITION. (London: *Whittaker & Co., and George Bell.*)

KNOWING how many editions of Horace already have appeared, with notes brief and notes voluminous, notes English and notes Latin, one might have supposed another edition superfluous. And yet one would have been decidedly wrong. If we had been compelled to order Horaces for use in a school, we should have been really much perplexed. Latin notes, and consequently Orellius' edition, which one would otherwise have adopted at once, seem out of the question in the case of younger scholars, who are generally the readers of Horace. But, having settled thus much, we should have felt somewhat inclined to avoid the difficulty of obtaining a desirable edition by adopting those which present the text alone, unspoiled by diffuse, or rendered dangerous by careless, notes. Recently, however, Mr. Macleane published a most admirable edition of this favourite author; one likely, as it fully deserves, to supersede to a great extent all others for common use. No edition of any classical writer ever published displayed greater common sense, or revealed a mind more untinctured with the tedious and trifling pedantry so often observed in a commentator on the Greek and Latin classics. There were symptoms of vigorous intellect and independent thought, which could judge for itself without servilely following a herd of preceding commentators. Each ode was accompanied by an introduction containing an account of the poem in question, a notice, the Greek original by which it might be thought suggested, and other collateral matter of interest. These were extremely useful, and often a single word there saved a longer note. This edition, however invaluable to the more advanced scholar, was, from its size and price, excluded from such general adoption for the use of younger scholars as it deserved from its excellence. The present volume, therefore, has been prepared by Mr. Macleane for the express use of schools. The notes are much briefer, and the portions of the larger work not required have been omitted. For instance, accounts of various readings, lengthened remarks on the different interpretations of conflicting editors, are dropped altogether; and properly: with such matters the young learner has no concern as yet. For him the notes should be tolerably brief, and certainly dogmatic; and, consequently, the editor himself ought to be, like Mr. Macleane, a man of admitted talent, whose dogma is worth having. The notes here are not over full of interpretations of various passages of the text. The editor justly observes, in his preface, it is hard to determine always whether help in this way is really wanted, or is only superfluous, and likely to induce idleness in the scholar. We think Mr. Macleane has successfully preserved in this edition the golden mean. Where assistance is really desirable, on the score of difficulty of construction, or for other reasons, a rendering is subjoined, otherwise it is justly discarded. Parallel passages, also, from strange authors are wisely omitted, and only cited from writers likely to be accessible to the young reader; and, as a rule, Horace is made chiefly to illustrate himself. Valuable remarks on general principles of construction are offered: on the use of the indicative, for instance, in the phrase "*sunt quos juvat*" in the first ode. We may add, there is nothing of that overstrained admiration for his author so tiresomely exhibited by some commentators. On the other hand, Mr. Macleane views Horace with due appreciation of his real merits. The book is made still more complete for use by the addition of indices to facilitate reference to passages required either in the text or notes. We cannot refrain, in conclusion, from hoping that this excellent edition will be largely adopted.

XENOPHON'S ANABASIS, EXPLAINED BY DR. F. K. HERTLEIN. TRANSLATED FROM THE GERMAN, BY REV. H. BROWNE, M.A. (London: *Rivingtons.*)

THE latter portion of this volume, containing the last four books of the Anabasis, has been already published, since Mr. Arnold's death, in a separate volume, as "The Fourth Greek Book." The present work contains the earlier books, with notes by the same commentator, bound up with the earlier book mentioned above. The notes are tolerably good in matter, but disagreeable in form, owing to the numerous brackets so often occurring in Mr. Arnold's editions; for instance, in page 21 of the notes to the first part of the book, in three lines there are three sets of brackets. This produces confusion, so that one hardly knows to whom the different remarks are due—Hertlein or the translator. We would also suggest to Mr. Browne the expediency of adopting a less repulsive type for the text; the present one is very small and crabbed-looking, and too close: and, altogether, the look of the book is sufficient to discourage, before beginning, the young scholar. A tolerably large, agreeable-looking type is not a matter of such little importance as some are disposed, perhaps, to think.

A COMPARATIVE GRAMMAR OF THE HEBREW LANGUAGE. BY JOHN WILLIAM DONALDSON, D.D. (London: *J. W. Parker & Son.*)

A GRAMMAR is usually supposed to have for its object the communication of the knowledge of a particular tongue. The author of the above work is probably himself an excellent Oriental scholar, but we cannot help thinking that any one who attempts to learn Hebrew through the medium of the present grammar will relinquish the attempt as hopeless, and leave off about as wise as he began. The author indeed in his preface informs us, that the system here adopted has already been tried for many years at the grammar school of which he is the Principal; and the work in consequence is sent into the world rather as a successful result, than as a precarious experiment. Now the general idea of connecting more intimately than heretofore Hebrew with the classical languages, was certainly likely to prove successful in the case of those who were tolerably well acquainted with Greek and Latin; and this we conceive is all the author intends to assert, in the remarks alluded to above. In no other sense whatever can we for a moment suppose the grammar in question to have proved a successful experiment, excepting only the point how far a grammar could be written without the possibility of one's learning the language from it: of this problem it is, we must admit, a tolerably felicitous solution. The first objection we have to it is, that all along the English characters are used to express Hebrew words. In our opinion, it is best at once, and from the first, to accustom the learner to the characters of the language he is studying. Nothing looks more uncouth and unprepossessing than a foreign language with its peculiar characters represented in English letters. We do not teach Greek in this manner; why should we then adopt so repulsive a method in Hebrew? Again, in the nouns, Dr. Donaldson seems to consider one declension only necessary, although he certainly makes up for it elsewhere by establishing an unnecessary case, the locative. Of the changes of vowels, so perplexing a feature in the Hebrew Grammar, we see little or nothing, and so cannot but think the work, to use Mr. Donaldson's own distinction, not "concise," but "imperfect." In the conjugation of verbs, Mr. Donaldson, to atone for his former deficiency in the nouns, makes some eighteen; the last eleven probably averaging about a verb a piece: in this respect we also, again quoting the author's own words, look upon his grammar as not "complete," but singularly "redundant." These, however, are comparatively of minor importance: the glaring fault of the book appears to us to be that of excessive refinement and speculation, and determined establishment of intimate relations between Hebrew and other languages. To show our meaning, we will quote a paragraph from the chapter on the pronouns—it runs thus: "The plural of the first personal pronoun seems to be a compound of the singular of the first two pronouns, with a form which strikingly reminds us of the Indo-Germanic *νωι* '*nos*,' Sanscrit '*nas*.' It has been shown elsewhere that the first personal pronoun cannot have a plural in the ordinary acceptation of the term, but that 'we' must imply 'I + you,' or 'all who are here.' Now, the Hebrew 'we' seems to have combined both expedients. Whatever may have been the origin of the Greek *τυ*, the constant substitution of 't' for a guttural forbids us to doubt the ultimate identity of the element 't' in the pronoun, and 'kā' in the affix of the same person. It seems therefore that the strong guttural in 'hănaʿhnū' represents this 'kā,' and that the whole compound is 'hani + kâ + nû = I + you + all here.'" We thought this tolerably hard for the young learner to get over, but it turns out that this is as yet smooth water; for we are warned, by an alarming assurance in the next paragraph, that "the plural forms of the other pronouns present difficulties considerably greater." Paragraphs like the above, and many still more obscure, occur in the work. All we can say is, that if the forty Bury young gentlemen, alluded to in the preface, are fed on meat so strong as this and thrive, there will be giants before long in that region. We may, meantime, be allowed to doubt whether Dr. Donaldson's hope of an increase of Hebrew scholars, by reason of this grammar, will be increased; for our part, we think the reverse.

CICERONIS ORATIO PRO MILONE: WITH ENGLISH NOTES, ETC. BY THE REV. JOHN SMYTH PURTON, M.A. (London: *J. W. Parker & Son.*)

THIS edition of Cicero's famous speech in behalf of Milo, when put on his trial for the murder of Clodius, appears everything one could wish. In the first place, the type is particularly neat, and the getting up exceedingly good; at the side of the chapters, or each paragraph, a short analysis is added to explain the contents of the portion of text opposite to it, or trace the course of the argument. This general view of the sense will be found serviceable. There is prefixed to the speech a translation of the copious introduction to the Oration by Asconius Pedianus, the all but contemporaneous annotator on the speeches of Cicero. In this preface a full account is given of all matters connected with the subject of the speech, and all information collected that can possibly be of use to enable the reader to form a clear idea of the state of affairs at the period of the trial. There are appended notes, as copious as the case requires; possibly more so: long annotations are like great books in the old proverb, viz. great evils. Mr. Purton has been, we think, a little prolix now and then. In his anxiety to illustrate everything requiring it, he occasionally has done more than was necessary. For instance, on chapter 9, we find six whole lines rendered into English, although not a single word or phrase of the least difficulty occurs; and in like manner, throughout the chapter, exceedingly simple phrases, about which there can be no difference of opinion, and wherein no one, except by excess of ingenuity, could go wrong, are considered worthy of translation. For instance, "*quod re intellectum est*" hardly merited an English rendering. However, in spite of this occasional redundancy, the notes are good, because full information is always given on any point where it is needed, and allusions and references fully explained. If one lights upon a hard passage in the text, one is sure to find something about it in the notes.

THE HOMERIC DIALECT: ITS LEADING FORMS AND PECULIARITIES. BY JAMES S. BAIRD, T.C.D. (London: *George Bell.*)

FROM an Attic writer of the pure age to Homer is a great step in point of dialect. Boys, after reading for some time—as they certainly ought to do during the earliest period of their Greek studies—the Attic writers only, on being transferred to Homer at once feel wide at sea. Forms they have no conception of, some longer, some mysteriously shorter, than those they have been acquainted with, some changed beyond all possibility of recognition, beset them on all hands. Short vowels are lengthened, long vowels are shortened, new syllables are tacked on to verbs at either end, in a most irregular and freakish manner. The present work of Mr. Baird is intended to introduce light into all this darkness, and order into all this confusion. He goes regularly through the parts of speech, nouns, adjectives, verbs, &c., and under each gives a full account, in tables, of the different and irregular inflexions to which these parts of speech are liable in Homer. This is done so completely, that we can hardly think it possible for the learner not to detect in this book an explanation, or notice, of any the slightest deviation from the orthodox usage of the Attic dialect to be found in Homer. They are all relentlessly dragged to the light, and laid bare to the young scholar.

ANSWERS TO THE MATHEMATICAL QUESTIONS.

QUES. 195.—*Proposed by Mr. John Thompson.*

Given $x^4 + 5 - 2\sqrt{x^2 - 2} = 5x^2$, to find x.

Solution, by Mr. J. Godward, Mr. C. Mansford, Mr. E. Rutter, and Z.

From the given equation we have

$$x^4 - 4x^2 + 4 = x^2 - 2 + 2\sqrt{x^2 - 2} + 1;$$

extracting the square root of each side and transposing

$$x^2 - 4 \mp \sqrt{x^2 - 2} = \pm 1;$$

solving this, first taking the upper signs, and secondly the lower,

$$x = \pm \tfrac{1}{2}\sqrt{(14 \pm 2\sqrt{5})}, \text{ or } \pm \tfrac{1}{2}\sqrt{(6 \pm 2\sqrt{-3})}.$$

QUES. 196.—*Proposed by Amicus.*

On Maundy Thursday it is the custom to give each of as many old men the same number of pence as there are years in the sovereign's age; since her majesty's accession 16 Easters have passed away, and the sum of £14 15*s.* 4*d.* has been thus distributed; determine the Queen's age last Easter (1853).

Solution by Mr. W. H. Levy, Mr. S. Dyer, and E'.

Let x = age of the Queen, the first Easter after her accession; then the sum of all the pence given to the present time

$$= x^2 + (x + 1)^2 + (x + 2)^2 + \text{\&c. to 16 terms}$$

$$= 16x^2 + 240x + 1240 \text{ (see Hind's Alg. p. 197, 4th ed.)}$$

$$\therefore \text{ by the question } 16x^2 + 240x + 1240 = 10744$$

$$\text{hence } x^2 + 15x = 594, \text{ and } x = 18.$$

$$\because \text{ Queen's age last Easter} = 18 + 15 = 33 \text{ years.}$$

QUES. 197.—*Proposed by A. G. P., Herts.*

Show the times of a planet's describing the two halves of its elliptic orbit, intercepted by the extremities of its axis minor, are in the ratio of $\pi + 2e$ to $\pi - e$; where e is the excentricity.

Solution, by A. G. P., Mr. Levy, and E'.

Let A a and B b be the major and minor axes, C the the centre, and S the nearer focus to A, also let A C = a, and B C = b, then C s = $a\,e$,

$$\text{area B A } b\, s = \tfrac{1}{2}\pi a b - a b e = \tfrac{1}{2} a b (\pi - 2e)$$

$$\text{area B } a\, b\, s = \tfrac{1}{2}\pi a b + a b e = \tfrac{1}{2} a b (\pi + 2e)$$

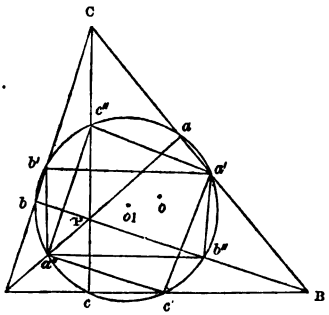
Now by Kepler's second law the areas swept out about S are proportional to the times of describing them, therefore

$$\frac{\text{time of describing B A } b}{\text{time of describing B } a\, b} = \frac{\pi - 2e}{\pi + 2e}.$$

QUES. 198.—*Proposed by Mr. T. T. Wilkinson.*

In the triangle A B C let a, b, c, be the points where the perpendiculars meet the sides; a', b', c', the middle points of the sides; and a'', b'', c'', the middle points of the lines joining the angles of the triangle to the point of intersection of the perpendiculars: then the nine points $a, b, c, a', b', c', a'', b'', c''$, lie on the circumference of the same circle.

First Solution, by Mr. Wilkinson; and similarly by Mr. Rutter, and Z.



Let A B C be the triangle, and P the intersection of the perpendiculars. Join a', b', a'', b'', a', c', a'', c''. Then since P A, P C are bisected in a'', c'', and B A, B C in c', a', the lines $a''\,c''$, $a'\,c'$, are each parallel and equal to $\frac{1}{2}$ A C. For similar reasons $a''\,c'$ and $a'\,c''$ are each parallel and equal to $\frac{1}{2}$ B P. But since B P is perpendicular to A C, the figure $a'\,c'\,a''\,c''$ is a rectangle, and consequently the four points a', c', a'', c'', are in a circle upon $a'\,a''$ or $c'\,c''$ as diameter. Similarly $a'\,b'\,a''\,b''$ is a rectangle, and the four points a', b', a'', b'', are in a circle upon $a'\,a''$ or $b'\,b''$ as diameter, that is in the aforesaid circle. But the points a, b, c, are also in this said circle, since $\angle\, a'\,a\,a'' = \angle\, b'\,b\,b'' = c'\,c\,c'' =$ a right angle; wherefore the nine points $a, b, c, a', b', c', a'', b'', c''$, all lie in the circumference of the same circle.

Second Solution, by Geometricus; and similarly by Amicus.

Take c B, c C as axes, and let c B = s, c A = s', and c C = p. We will first find the equation of the circle through c, c', c'', and then test the other six points. Since the $\angle$ s A P B, A C B are supplemental, C P = $\dfrac{s s'}{p}$; hence $c\,c' = \dfrac{s - s'}{2}$ and $c\,c'' =$

$\dfrac{c\text{C} + c\text{P}}{2} = \dfrac{p^2 + s s'}{2p}$. Therefore the co-ordinates of the centre are $\dfrac{s - s'}{4}, \dfrac{p^2 + s s'}{4p}$,

and $(\text{rad})^2 = \left(\dfrac{s - s'}{4}\right)^2 + \left(\dfrac{p^2 + s s'}{4p}\right)^2 = \dfrac{(p^2 + s^2)(p^2 + s'^2)}{16 p^2}$; from which we

find the equation of the circle through c, c', c'', to be

$$2p(x^2 + y^2) - p(s - s')x - (s s' + p^2)y = 0 \ldots (1).$$

Again eq. to B C is $\frac{x}{s} + \frac{y}{p} = 1$, eq. to A a is $\frac{1}{p}(x + s') = \frac{y}{s} \ldots (2)$

eq. to A C is $-\frac{x}{s'} + \frac{y}{p} = 1$, eq. to B b is $\frac{1}{p}(x - s) = -\frac{y}{s'} \ldots (3)$.

Equations (2) give the co-ordinates of $a = \frac{s(p^2 - ss')}{p^2 + s^2}, \frac{ps(s + s')}{p^2 + s^2}$,

$\ldots\ldots (3) \ldots\ldots\ldots\ldots\ldots\ldots \; b = -\frac{s'(p^2 - ss')}{p^2 + s'^2}, \frac{ps'(s + s')}{p^2 + s'^2}$

also the co-ordinates of $a' = \frac{s}{2}, \frac{p}{2}$; of $b' = -\frac{s'}{2}, \frac{p}{2}$; of $a'' = -\frac{s'}{2}, \frac{ss'}{2p}$; and of $b'' = \frac{s}{2}, \frac{ss'}{2p}$.

It will be found that each of these six sets of co-ordinates satisfies (1); hence the nine points a, b, c, a', b', c', a'', b'', c'', lie in the circumference of the circle whose equation is (1).

The solutions by Mr. Levy and E′ merited insertion, had space permitted.

LIST OF MATHEMATICAL ANSWERS.

Amicus, ans. 195, 196, 197, 198; S. Dyer, Leytonstone, ans. 195, 196; E′, Great Stukeley, ans. 195, 196, 197, 198; Geometricus, London, ans. 198; J. Godward, Chelsea, ans. 195, 196; W. H. Levy, Shalbourne, ans. 195, 196, 197, 198; Charles Mansford, Westminster, ans. 195, 196; A. G. P., Herts, ans. 197; E. Rutter, Sunderland, ans. 195, 196, 198; Mr. John Thompson, London, ans. 195, 196; Mr. T. T. Wilkinson, Burnley, ans. 197, 198; and Z., Leeds, ans. 195, 196, 198.

NEW QUESTIONS,

TO BE ANSWERED IN OUR NUMBER FOR JANUARY, 1854.

QUES. 199.—*Proposed by Mr. Dyer.*

Given $x^3 - 13x = 12$, to find x by quadratics.

QUES. 200.—*Proposed by Mr. W. H. Levy.*

If the squares of the lines from the angles of any plane triangle to the centre of the inscribed circle be in arithmetical progression, then the sides will be in harmonical progression.

QUES. 201.—*From the Senate House Problems for* 1853.

$$\text{If } \frac{\sin(\theta - \alpha)}{\sin(\theta - \beta)} = \frac{a}{b}, \text{and } \frac{\cos(\theta - \alpha)}{\cos(\theta - \beta)} = \frac{a'}{b'},$$

$$\text{then } \cos(\alpha - \beta) = \frac{aa' + bb'}{ab' + a'b}.$$

QUES. 202.—*Proposed by Mr. T. T. Wilkinson.*

In the diagram to question 198; let O, O_1 be the centres of the circles circumscribing the triangles A B C, $a\,b\,c$; prove that O O_1 = O_1 P, and $O_1\,a = \frac{1}{2}\,O_1\,A$.

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